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# MONTHLY NOTICES

4987

OF

# PAPERS & PROCEEDINGS

OF THE

# ROYAL SOCIETY

OF

# TASMANIA,

FOR

# 1868.

TASMANIA:
PRINTED AT THE "MERCURY" STEAM PRESS OFFICE, HOBART TOWN.
1869.

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# ERRATA.

Page 7. –Third line from bottom, for " Ireside" read " I reside."

Page 7 and 8.—The second, third, and fourth paragraphs of Dr. Mueller's paper should have been placed between inverted commas.

Page 9.—Eleventh line from bottom, for " romeriformis" read "vomeriformis."

Page 10.—Fifth line from top, for " Phryptomene" read " Thryptomene."

Page 10.—Tenth line from bottom, for " Leptorrynehus" read " Leptorrynchus ;" and for " Les's Oyn" read " Less. synops."

Page 10.—Next line, for " Les's" read " Less."

Page 12.—Seventh line from top, for " literal" read " litoral."

Page 12—Twenty-fifth, twenty-seventh, and twenty-ninth lines from top, for " Lypiranthus" read " Lyperanthus."

Page 19.—Ninth line, first paragraph, for " ludochrome" read " endochrome."

Page 22.—Thirty-first line, for " dug up" read " dried up."

Page 23.—Sixth line, second column, for " 1 U.S." read " 1 n. s."

Page 23.—Tenth line of ditto, for " Auhistrodesmus" read " Ankistrodesmus."

Page 24.—Last column of table, at bottom, for " 14·67" read " 10·21."

Page 24.—Ninth column of table, at bottom, for " 67·33" read " 67·23."

Page 24.—Second column of table, at bottom, for " 29·931" read " 29·981."

Page 40.—Eighth line from bottom, for " States" read " State."

Page 46.—Twenty-first line, for " Microscope" read " Spectroscope."

Page 49.—Meteorological table, in the maximum and minimum of air columns, for the figures printed, read as follows :—

| Max. of air. | Min. of air. |
|---|---|
| ° | ° |
| 63 | 31 |
| 64 | 30 |
| 66 | 32 |
| 64·3 | 31·3 |

Page 79.—Lines ten and eleven from bottom should read thus :—" Society Zoological of London, Transactions of, Vol. 6, Part 6, Osteology of Sperm Whale."

# ROYAL SOCIETY.

## MARCH, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, the 24th March, J. Barnard, Esq., in the chair.

Mr. William Knight, jun., who had been previously nominated by the Council, was after a ballot duly elected as a Fellow of the society.

Mr. M. Allport (on behalf of the Secretary, Dr. Agnew,) laid on the table the following returns:—

1. Visitors to Museum, February, 606.
2. Ditto to Gardens, February, 2003.
3. Plants and seeds received at Gardens.—From Mr. C. F. Wren, Auckland, New Zealand, 82 plants, of which 14 were dead on arrival. From Mr. T. Campbell Carey, 16 papers seeds, indigenous to Western Australia.
4. Plants and seeds sent from Gardens.—To A. Werschaffelt, Ghent, Belgium, per Windward, 10 small tree Ferns. To Mr. J. Harriss, Melbourne, 63 plants, 50 papers seeds, 50 varieties of hyacinth, and 24 ditto of ranunculus.
5. Leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
6. Books and periodicals received.
7. Presentations to Museum.

*Meteorological Observations.*

1. Hobart Town, from F. Abbott, Esq.,—table for February, with summary.
2. Port Arthur, from J. Boyd, Esq.,—ditto for January.
3. Swansea, from Dr. Story,—ditto for February.
4. Westbury, from F. Belstead, Esq.,—ditto for February.
5. Sydney, New South Wales, from G. Smalley, Esq., government astronomer, printed table for January.
6. Lighthouses, &c., viz., Kent's Group, Goose Island, King's Island, Swan Island, South Bruni, Mount Nelson, for the six months ending the 31st December, 1867. From the Marine Board.

The presentations to the Museum were as follows:—

1. From J. L. Smith, Esq., (per M. Allport, Esq.) A curious fish found on the beach at Table Cape.
2. From R. D. Lord, Esq., Oatlands. A pair of mountain ducks *(Casarca tadornoides)*, prepared for mounting.
3. From Miss Sharland. A Kingfisher *(Alcyone azurea.)*
4. From A. H. Maning, Esq. A White Hawk *(Astur Novæ Hollandiæ)*, Shot at Sandy Bay.
5. From Mr. Young, Prince of Wales Bay, Glenorchy. A Petrel.

[With reference to this presentation Mr. Allport stated that the bird was taken at the time Mr. Young's premises were destroyed by fire. Being probably attracted by the light it flew through the flames and was picked up alive. Mr. Allport further remarked that it was unusual to find these birds so far inland although they were frequently seen off the coast.]

6. From J. Boyd, Esq., Port Arthur. Veneers of 28 varieties of Tasmanian woods, mounted and polished. These specimens were prepared for the Paris Exhibition, and shew in a striking manner the great beauty of many of the Tasmanian woods, and their value for ornamental purposes.
7. From T. Ashworth, Esq., Bath, per J. A. Youl, Esq. Five full sized diagrams representing salmon and trout captured in the Severn and Tay, and at Galway.

Mr. M. Allport read the following letter from Dr. F. Mueller, of the Melbourne Botanic Gardens, which had been received by the Secretary, Dr. Agnew:—

"Melbourne Botanic Gardens,
"7th January, 1868.

"Allow me, dear Dr. Agnew, to offer you, as Hon. Secretary of the Royal Society of Tasmania, a few pages of observations on Tasmanian plants. If such contributions should prove acceptable for the Society's publication, I will gladly from time to time offer others, and thus special supplements would arise to Dr. Hooker's work from new material. This single contribution brings already 25 plants left unrecorded by my illustrious friend.

"The impression may thus also be removed that nothing was left to be recorded in Tasmania; thus intelligent and educated observers might feel induced to send methodically and periodically contributions to me for further elucidation of the plants of your islands.

"I long myself to visit King's Island and Flinders' Island, not merely because in those dependencies of Tasmania many a plant will yet be found new to your territory; but more especially with a view of contrasting the vegetation there with that of Gipps Land, and to trace it to its geological relation. The same physiographic enquiries may lead me yet to your Alps; and such excursions may contribute much also to the buoyancy of mind, and the consolidation or restoration of health, all of which I sadly am missing, as I am but partially recovered from my long and severe illness.

"By the next Hobart Town steamer I shall send a number of Chinese tea plants, and others calculated to live in your mild fern-tree glens. If you could afford space and provide a temperature of 80 deg. F., I could send also a plant of the magnificent waterlily, the *Victoria regia*.

"Your very regardful,
"FERD. MUELLER.

"N.B.—I could only send fragments of some of the plants in letter form."

The paper alluded to entitled "Contributions to the Phytography of Tasmania" was then read.

In reference to Dr. Mueller's interesting paper Mr. M. Allport observed that the Fellows of the Society ought to mark in a distinct manner their appreciation of the Doctor's efforts to afford them instruction, and to benefit their Transactions by the contribution of valuable papers such as that he had just had the honor to read. Mr. Allport concluded by proposing that a special vote of thanks should be accorded to Dr. Mueller, which was seconded by Mr. Giblin, and unanimously carried.

Mr. M. Allport next called the attention of the Fellows present to the diagrams of salmon and trout forwarded as a present to the Society by Mr. James A. Youl, and which afforded another proof of the continual interest which that gentleman took in the welfare of Tasmania. In reference to the largest of these figures, which represented a fish weighing 50lbs., the probability was (if the statements of the learned were to be relied on) that the age of this fish was about 10 years, as after the 3rd year salmon are supposed to add about six or seven lbs. per annum to their weight. Of course he (Mr. Allport) had had no opportunities of testing the truth of these statements himself, but judging from the rapid growth of some fresh water fish which he had carefully observed in limited waters, and from circumstances connected with the growth of some of our indigenous sea fish, he had little doubt of their truth. For instance, the kingfish which entered our rivers in summer, occasionally deposit their spawn far up towards the fresh water; on two separate occasions in the autumn he (Mr. Allport) had seen in the mouth of a small creek, near the river Jordan, a shoal of young kingfish from 4 to 8 inches in length, undoubtedly the produce of spawn laid that summer; with the first winter rains these fish disappear seawards, and in the summer following none but full grown kingfish are found, weighing from 12 to 15 lbs. The fish of intermediate size are never seen, and (though this is but negative evidence), the conviction was therefore strong in his mind that the kingfish grew from the egg into 12 lbs. weight in a single year. Amazing as this seems at first, it is not to be so greatly wondered at when we remember the voracity of these fish, and that their power of assimilating food is equal to their voracity. If one sea fish grows at this rate, it is but reasonable to suppose that many others also increase rapidly, and when we reflect that they are subjected to the attacks of innumerable enemies, is it not clear that the very existence of some species must depend in a great measure upon the rapidity of their growth? If it is true that many of our sea fish become rapidly marketable after spawning it is quite certain that very slight protection afforded to them on and near to the spawning places would prevent the utter eradication which has for a long time threatened many species. Unless something is done in this direction we shall sooner or later have to deplore the loss of valuable fish, which a little well directed care might now preserve for all time.

Dr. Butler mentioned that certain blue books containing reports on the salmon and other fisheries of the United Kingdom had recently been received from England, and were now in the Parliamentary Library. He thought it very desirable that all available information on the subject should be placed at the disposal of the Society, and moved that the Council be requested to apply to Government for the books referred to.

Mr. Giblin seconded, and the motion was carried.

A long and interesting conversation ensued as to the present state of the fisheries of the island, and the want of protection being extended to them. Several of the Fellows pointed out the want of some such system of protection, especially for the oyster fisheries, as is observed elsewhere. Mr. Davies moved, and Dr. Butler seconded, that a committee consisting of Messrs. T. Giblin, M. Allport, and H. J. Buckland be appointed for the purpose of enquiring generally into the state of the fisheries of Tasmania, including the oyster fisheries, such committee to bring up a report in order that some action may be taken by the Society to move the Government or Parliament in the matter. The motion was agreed to, and the usual vote of thanks having been accorded to the donors of presentations the meeting terminated.

## APRIL, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, the 14th April, J. Barnard, Esq., in the chair.

Dr. W. O. Sonder, Foreign Hon. Secretary of the Society of Naturalists, Hamburgh, who had been previously nominated by the Council, was after a ballot declared to be duly elected as a Corresponding Member of the Society.

The Secretary, Dr. Agnew, laid on the table the following returns for the past month, viz.:—

1. Visitors to Museum, 500.
2. Ditto to Gardens, 2071.
3. Plants, &c., received at gardens. From Mr. J. Harriss, Melbourne, 1 case containing 47 plants.
4. Plants, &c., sent from Gardens.—To Mr. R. Henderson, Sydney, a collection of bulbs.—To Messrs. Taylor and Sangster, Melbourne, a collection of bulbs, and 29 papers of seeds.—To Messrs. Handasyde and Co., Melbourne, a collection of bulbs, and 62 papers of seeds. To. Dr. R. Schomburgh, director of Botanic Gardens, a collection of bulbs and 29 papers of seeds.
5. Times of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
6. Books and periodicals received.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq.—Table for March, with summary of observations.
2. Port Arthur, from J. Boyd, Esq.—Table for February.
3. Swansea, from Dr. Story.—Ditto.
4. Westbury, from F. Belstead, Esq.—Table for March.
5. Sydney, from G. R. Smalley, Esq., Government Astronomer.—Table for February.

The presentations were as follows:—

1. From Mr. T. Oldham, specimen of the spur-winged Plover *(Lobivanellus lobatus)*, shot at Sorell.
2. From Mr. G. W. Rex, specimen of the hoary-headed grebe *(Podiceps poliocephalus.)*
3. From M. Allport, Esq., specimens of fish *(Galaxias sp.)* from Great Lake, Tasmania, native freshwater Perch, English Perch from this year's ova, and a Sawfish.

Mr. F. Abbott read a paper entitled "Some continued observations on the variable star η Argus and the surrounding nebula."

This paper was illustrated by a drawing of the object taken at three different periods from 1834-7 to February, 1868. The monographs of Sir John Herschel taken at the Cape of Good Hope, and a record of the star from the time of Halley, 1667, were also laid on the table.

Discussion ensued, and votes of thanks having been accorded to Mr. Abbott, and to the donors of presentations, the meeting terminated.

## MAY, 1868.

The monthly meeting of the Fellows was held on Tuesday, 12th May.

The Secretary informed the meeting that His Excellency the President intended to be present this evening, but was accidentally prevented by the arrival of H.M.S. Virago, which necessitated his presence at Government House.

The following returns were laid on the table:—

1. Visitors to Museum during April, 466.
2. Ditto to Gardens ditto, 1,578.
3. Plants received at Gardens:—From Mr. R. Henderson, Sydney, 21 plants. From Mr. C. F. Creswell, 64 papers seeds received per overland mail.
4. Plants sent from Gardens:—To A. Verschaffelt, Ghent, 12 tree ferns *(Dicksonia antarctica)*. To Messrs. Taylor and Sangster, Melbourne, 1 case containing 40 plants.
5. Leafing, flowering, and fruiting of a few standard plants at Botanic Gardens.
6. Books and periodicals received.
7. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq., table and summary for April.
2. Port Arthur, from J. Boyd, Esq., table for March.
3. Swansea, from Dr. Story, table for March.
4. Westbury, from F. Belstead, Esq., table for April.

The presentations to the Museum were as follows:—.

1. From J. W. Graves, Esq. An English fox *(Canis vulpes)*, prepared and mounted; two specimens of the Banded Grass Finch *(Poëphila cincta.)*
2. From M. Allport, Esq. Eggs and young of Dog-fish.

[These were the eggs of the common spined Dog-fish of the Derwent, taken from a specimen 4 feet long caught by Mr. M. Allport off the Iron Pot Lighthouse. When fresh taken these would have been admirable objects for microscopic investigation, as the umbilical cord, by which the young fish is attached to the yolk of the egg, is of such a length that it could easily have been placed across the field of the instrument while the fish and egg remained in the water; the circulation through the large vessels would thus have been easily observed. As an instance of the vitality of immature forms of many creatures, these eggs were remarkable, the small fish attached to one of them exhibiting lively motion after being removed from the parent fish, and remaining on the deck of the vessel for nine hours. The smaller blood vessels, spread over the surface of the yolk like rivers on a map, were very clearly shown on these specimens when fresh.]

3. From Salmon Commissioners. A young Salmon Trout *(Salmo trutta)*, found dead in the breeding pond at the River Plenty.
4. From His Excellency Colonel T. Gore Browne. A specimen of the artificial stone of which the new Wesleyan Church at Launceston is built.
5. From Mr. Allison, Oatlands, two Black Magpies. *(Strepera fuliginosa.)*
6. From Mr. G. Joseph, Single Hill, a Coot. *(Fulica Australis.)*
7. From Mr. T. Wise, skull of Seal.
8. From J. Beamont, Esq., specimens of printed and written official documents of the colony, dated 1817, &c.
9. From G. Gellibrand, Esq., sample of Coal from Grey River, New Zealand.

The Secretary read a paper by Mr. E. D. Harrop, of Launceston, "on Desmidiaceæ, with a list of species found in Tasmania." Accompanying it were numerous and very well executed drawings (by the writer) of these minute forms of vegetable life. The paper was listened to with greatest interest, and will appear in the transactions of the society.

In reference to the very able paper of Mr. Harrop, Mr. Allport stated that one very strong argument against the Desmidieæ belonging to the animal kingdom—in which they have by some naturalists been included—was the entire absence of anything like a digestive cavity. Mr. Allport also observed that many, and probably quite new varieties of the Desmidieæ were to be found in the salt swamps of the colony.

Mr. Abbott suggested that Mr. Harrop's paper should be forwarded to the Royal Microscopical Society of London, who he thought would print it in their journal, and at the same time illustrate it by engravings from the drawings. This society could then procure a copy by applying for it.

The Secretary brought forward a communication from Mr. A. Biggs, of Bothwell, "on a method of making microscopic measurements," for which Mr. Biggs claims some advantages over those in general use. As, however, the hour fixed upon for the microscopical soiree was now approaching it was determined that the reading of the paper should be postponed till the next meeting, when it might obtain a more lengthened consideration.

The thanks of the meeting were given to the donors of presentations, and a special vote was accorded to Mr. Harrop for his valuable contribution.

The meeting then terminated, and the Fellows proceeded to the microscopical exhibition in the large room of the museum.

Here a number of microscopes, each supplied with a variety of objects, were collected. Mr. F. Abbott, by means of a powerful standard instrument, brought under notice many exquisite forms of the first order of diatomaceæ, also beautiful specimens of marine plants parasitic upon algæ and zoophytes, together with many other objects of great interest. Mr. Abbott also contributed a large number of enlarged photographs of microscopic objects beautifully executed by Dr. Maddox. Another instrument shown by Mr. Abbott was a dissecting microscope on the plan adopted by the celebrated Darwin, and fitted with a large doublet designed by him and used in all his experiments. Under this power was exhibited a series of metallic objects.

With another instrument of binocular construction Mr. Abbott, junior, shewed a choice series of botanical sections, chiefly colonial.

Mr. Morton Allport contributed one of the most beautiful objects of the evening in the volvox globator, of which the incessant rotatory motion, and delicate traceries were well displayed, and excited general attention.

Mr. W. Stone exhibited rotifers and animalcules from rain and pond water, some of which were magnified to 480 diameters.

Numerous crystals of salts under the varied and beautiful changes produced by polarised light were exhibited by Mr. W. Knight, junr.; and Mr. Napier also shewed many crystals under similar circumstances, together with some forms of minute animal life, such as polyzoa, &c.

Mr. T. Westbrook provided a binocular microscope, and shewed a variety of selected objects.

Mr. Legrand exhibited for the society specimens of Foraminiferæ collected by himself at Sandy Bay—also spores of ferns, which were examined with great interest by most of the visitors present.

The society also furnished an interesting collection of the hair and fur of indigenous animals, also a number of objects illustrative of insect structure, with microscopic photographs, &c.

The meeting broke up about 10 o'clock, when the numerous visitors departed highly gratified with the exhibition, which had been organised expressly on their behalf.

# CONTRIBUTIONS TO THE PHYTOGRAPHY OF TASMANIA.

[By **Fred. Mueller**, M.D., F.R.S.]

This brief allusion to some plants, either unrecorded from Tasmania or rare in its territory, refers to contributions gained from various sources. Robert Brown's great treasures furnished some of the data, as will be evident on reference to the universal work on Australian Vegetation, issued by the President of the Linnean Society. Others of the plants were kindly transmitted by Mr. J. Bennett from the British Museum, and gathered by Dr. Jos. Milligan. Some were detected by Mr. Aug. Oldfield, and remained unnoticed in the supplemental contribution, which it fell to my share to furnish for the "Flora Tasmaniæ." A few again were added by Mr. Walt. Bissell, in a recent voyage to the North-east Coast; while I was agreeably surprised to receive from the venerable Dr. G. Story an extensive set of Museum-plants, secured in the Oyster Bay district. From a letter of this gentleman I submit introductorily the following physiographic remarks, which claim in many respects originality:—

This district is a tract of waste, extending from Cape Bernier on the south to Doctor's Creek, or Seymour Coal Mines, on the north; it was formerly known as the District of Oyster Bay, as that bay occupies a considerable portion of the coast-line. At present the south part is in the County of Pembroke, and the other part forms the County of Glamorgan, forming together a coast-line of 80 miles. A strip of land for cultivation extends along the coast, and is backed by tiers of hills that extend westward to the midland districts of the island. The tiers are formed chiefly of basalt (greenstone), in some cases sand stone and the coal formation appears, but the latter is only met with on the coast-line. The Schouten Island and Freycinet's Peninsula have a strip of porphyritic granite on the eastern side, which granite extends to Bicheno. Sandy swamps, replete with plants, occur at intervals along the coast-line, and sandy swamps occur also in the granite formation, but with a different Flora.

Oyster Bay is from 20 to 30 miles in length, and about 15 miles broad. Maria Island lies at its mouth; the Schouten Island and Freycinet's Peninsula form the eastern side; Swansea is at the head of the western side of the bay and Kelvedon (where Ireside) is six miles south of Swansea. The rivers beginning generally south are Sandspit, Prosser's, Little Swanport (which forms a large pond or lagoon previous to entering the sea). Then several creeks, viz., Buxton's, Meredith, Cygnet, and Wye. Then comes the Great Swan River, and over a tier of hills the Apsley. These two form an extensive port 12 miles in length and four or five miles in breadth, and enter the head of Oyster Bay by a common mouth close to Freycinet's Peninsula; the only other river is the Douglas, near the coal mines. I have never collected plants to the north of Douglas River; it is, I suppose, 100 miles from thence to the north-east corner of the island, and the granite formation will be found in some places no doubt, where it is likely the plants allied to those of Gipps Land exist. Our climate is dry and mild, it is reckoned the most salubrious of any district in the island. The rain in 1864 was 31·16in.; 1865, 19·66in.; 1866, 24·99in.; average for the three years, 25·27in.

Like all other parts of Australia, droughts are long and often occur; thus the rivers are swollen torrents in heavy rain and dry beds in summer; their beds are often densely filled with shrubs.

The united collections offered not merely material for extending our knowledge of the range of the species, but they comprised even a number of plants (indicated in the subjoined enumeration by asterisks) not recorded in Dr. Hooker's great work as existing within Tasmanian territory, adding also the genera Euphorbia, Donatia, and Ixiolaena to the described Tasmanian vegetation.

Reserving for the supplemental volume of the Australian Flora more extended notes on these interesting plants, I beg meanwhile to place a succinct record thereon before the Royal Society of Tasmania, in order that residents there, who cherish a desire for promoting scientific objects, may be encouraged to reveal to us still further the rich vegetation which surrounds them. For researches in this direction Tasmania possesses rare advantages, because few spots in the world can boast of possessing so extensive a work on its vegetation as that which ever will remain a monument of Dr. Hooker's genius and of the sedulous zeal of Mr. Ron. Gunn, Dr. Milligan, and Mr. W. Archer.

The advancement of Phytographic labors should be an aim of each country. Without accurate definition of its plants we cannot reduce any observations on their industrial, therapeutic, or economical value to any solid basis, not to speak of the information thus arising as a never-ceasing source of delight, as an ever-elevating inspiration for religious reflection.

**Comesperma defoliatum.*—F. Muell. Plants of Vict. I., 189. Southport, C. St. In external appearance similar to C. calymegum; in internal structure very distinct.

**Gypsophila tubulosa.*—Bois's diagn. plant. Orient. I., 4. Locality as yet uncertain.

**Polycarpon titraphyllum.*—L. fil. Suppl. 116. Swanport, G. Story. This and the preceding plant may not be originally indigenous. In many instances it is now beyond possibility to ascertain which plants are immigrated. Under any circumstances they cannot be excluded from phytographic lists.

**Eriostemon Oldfieldii.*—F. Muell. fragm. phyt. Austr. I., 3. Mount Laperouse, Oldfield. Belongs to the section Phebalium.

*Eriostemon Hillebrandi.*—F. Muell. in transact. phil. Soc. Vict. I. 10. On granite at Apsley River. G. Story.

*Eriostemon virgatus.*—A. Cunn. in Hook. Journ. of Bot., II., 417. Swanport, G. Story. The ripe fruit unknown. The plant forms a transit to Boronia.

**Zieria cytieoidis.*—Smith in Rees's Cyclopœd. 4. On granite rocks at Bicheno. G. Story.

*Lasiopetalum micranthum.*—J. Hok. fl. Tasm. I., 51. Swanport, G. Story.

*Lasiopetalum dasyphyllum.*—Sieb. in Hook. Journ. II., 404. Flinder's Island and Cape Barren Island, J. Milligan.

*Viminaria denudata.*—Sin. Exot. Bot. 51 t. 27. This plant is here doubtfully inserted. It was received from Mr. Eng. Fitzalan along with other Tasmanian plants, without note of locality. It is extremely frequent in the coast straits of Victoria.

*Desmodium varians.*—Endl. Annal. des. Wien. Mus. I. 185. Cape Grim, J. Milligan.

**Acacia penninervis.*—Sieb. in Cand. pr. II., 453. Mount Wellington, Oldfield. This tree is not unfrequent in the subalpine regions of Victoria, and occurs very likely in several other parts of Tasmania.

**Acacia Oxycedrus.*—Sieb. in Cand. pr. II., 453. Sent by Mr. Fitzalan along with other Tasmanian plants. One of the most frequent species on the moor-heaths of Victoria.

*Acacia juniperina.*—Willd. Oper. Pl. IV., 1049. Swanport, G. Story.

*Acacia romeriformis.*—A. Cunn. in Hook. Lond. Journ. I., 332. Swanport, G. Story. Snug and Oyster Cove, Milligan.

*Geum renifolium.*—F. Muell. in Transact. Phil. Vict. Inst. II., 66. Alpine heights in the rear of Macquarie Harbour, Milligan.

*Spyridium Lawrencii.*—Benth. Flor. Austral. I., 430. Swanport, G. Story.

*Spyridium leucophractum.*—F. Muell. Fragm. Phyt. Austr., III., 77. Swanport, G. Story.

*Spyridium obovatum.*—Benth. Flor. Austr. I., 429. Swanport, G. Story.

*Cryptandra amara.*—Sm. in Transact. Linn. Soc. X., 295, t. 18. Swanport, G. Story.

*Kunzea corifolia.*—Reichenb. Consp. Regn.Veg. 175.Bicheno, G. Story.

*Phryptomene micrantha.*—J. Hook, in Kew Miscell., 1853, 290 t. VIII. Sandy granite land at Bicheno, G. Story. Macquarie Harbour, Milligan.

*Eucalyptus Globulus.*—Labill. Voy. I., 153, t. 13. Flinder's Island, Milligan.

**Euphorbia chamæsyce.*—Linné. Amœn.Acad.115. Swanport, G. Story. This plant ranges from the Mediterranean countries through South Asia, and extends over nearly the whole of the Australian continent. It introduces now for the first time the great cosmopolitan genus Euphorbia into the Tasmanian vegetation.

*Sicyos angulatus.*—Linné Sp. Pl., 1438. Sisters' Island, Milligan.

**Donatia Novæ Zelandiæ.*—T. Hook. Fl. N. Zel. I., 81 t. 20. Mount Sorell, Milligan. Mount Laperouse, Oldfield. Probably overlooked elsewhere in the glacier regions.

**Panax sambucifolius.*—Sieb. in Cand. Prodr. IV., 255. Douglas River, Milligan. The Tasmanian plant is hitherto known only in leaves. It seems, however, not distinct from the S.E. Australian tree, which in foliage has proved singularly variable.

*Aster ledifolius.*—A. Cunn. in Cand. Pr. V., 269. Mount Sorell, Milligan.

**Cotula filifolia.*—Thumb. Fl. Cap. 696. Kent's Group, R. Brown.

**Ixiolæna supina.*—F. Muell. in Transact. Vict. Inst. I., 32. Kent's Group, R. Brown.

**Cassinia longifolia.*—R. Br. in Transact. Linn. Soc. XII., 127. Bay of Fires, W. Bissell. Not rare on the opposite Australian coast.

**Leptorrhynehus linearis.*—Les's Oyn., 273. Derwent, R. Brown.

**Calocephalus citreus.*—Les's Synops. 271. Derwent, R. Brown.

*Helichrysum cinereum.*—F. Muell. in Benth. Fl. Austr. III., 629. Flinder's Island, Milligan.

*Helichrysum lycopodioides.*—Benth. Fl. Austr. III., 634. Tops of tiers, where water stagnates, near Kelvedon, also on Prosser's River. The leaves attain a length of four lines, and are then oblong linear.

*Helichrysum Backhousii.*—F. Muell. in Benth. Fl. Austr. III., 633. Gravelly banks of the River Apsley. G. Story.

*Helichrysum dealbatum.*—Labill. Nov. Holl Plant. Spec. II., 45 to 190. Flinder's Island, Milligan.

*Dampiera stricta.*—R. Br. pr. 589. Bay of Fires, W. Bissell. Kelvedon, G. Story.

*Scœvola Hookeri.*—F. Muell. in T. Hook. Fl. Tasm. I., 231, tab. 77. Swanport, G. Story.

**Scœvola cuneiformis.*—Labill. Nov. Holl.Pl. Specim., I., 56, tab. 80. Swanport, G. Story. If, as Dr. Hooker suggested, the plant of Labillardére should prove a distinct South-west Australian species, then the name Scævola æmula (Br. p. 584) should be adopted for this one from Tasmania. It is identical with Brown's plant, which is dispersed from Guichen Bay to Gipps Land.

**Scœvola microcarpa.*—Cavan. Icon. VI., 6 to 509. Flinder's Island, Milligan.

**Goodenia amplexans.*—F. Muell. in Transact. Phil. Inst., Vict. II., 70. On the Nile, C. St. This plant is precisely the same as the original from St. Vincent's Gulf.

**Goodenia barbata.*—R. Br. pr. 576. Tasmania, R. Brown. The writer has not seen Tasmanian specimens of this Goodenia, but as it is copiously occurring in east Gipps Land, there can be no doubt that it was found by R. Brown in the northern part of Tasmania, or on some of the adjacent islands which he visited. It is purple-flowered, though placed by R. Brown among the yellow-flowered species.

*Velleya montana.*—J. Hook. in Lond. Journ. of Bot. VI., 265. Swanport, G. Story.

*Epacris micranthera.*—F. Muell. Fragm. Phyt. Austr. VI., 72. Mount Sorell, Milligan.

*Styphelia adscendens.*—R. Br. pr. 536. Swanport, G. Story.

*Styphelia pinifolia.*—R. Br. pr. 536. Swanport, G. Story.

*Trochocarpa involucrata.*—F. Muell. Fragm. Phyt. Austr. VI., 57. Schouten Island, G. Story.

*Richea Dracophylla.*—R. Br. pr. 555. Mount Sorell. Milligan.

*Mitrasacme distylis.*—F. Muell. in Transact. Phil. Soc. I., 20. Kelvedon, G. Story.

*Westringia angustifolia.*—R. Br. pr. 501. Between Oyster Cove and Huon River. Milligan.

*Westringia brevifolia.*—Benth. in Cand. pr. XII., 570. Strzelecki's Peak, Flinder's Island, Milligan.

*Trichinium spatulatum.*—R. Br. pr. 415. Kelvedon, G. Story.

*Cassytha melantha.*—R. Br. pr. 404. Kelvedon, G. Story.

**Pimelea serpillifolia.*—R. Br. 360. Flinder's Island, Milligan. One of the most common of all plants along the whole shores from Spencer's Gulf to Gipps Land, likely to be found in some of the other literal tracts of Tasmania.

*Pimelea sericea.*—R. Br. pr. 361. Swanport, G. Story. There six feet high.

*Pimelea ligustrina.*—Labill, Nor. Holl. Pl. Sp. I., 9 to 3. Douglas River, G. Story.

**Hakea ulicina.*—R. Br. Suppl. 29. Flinder's Island, Milligan. Closely allied to H. dartyloides. Among the few Tasmanian Hakeæ remarkable for its leaves, always flat and three-nerved.

*Lomatia tinctoria.*—R. Br. pr. 389. Islands of Bass' Straits, Milligan. Not yet found on the mainland of Australia.

*Dendrobium Milligani.*—F. Muell. Fragm. Phyt. Austr., I., 88 to VI. Porphyritic rocks at Bicheno, G. Story. The most southern locality of any Dendrobium.

*Sarcodulus Gunnii.*—F. Muell. Fragm. Phyt. Austr., I., 90. Table Cape and Macquarie Harbour, Milligan. Sea Elephant's Bay, G. Story. Also in King's Island.

*Lypiranthus Burnettii.*—F. Muell. Fragm. Phyt. Austr. V., 96. Macquarie Harbour, Milligan.

*Lypiranthus nigricans.*—R. Br. pr., 325. Rocky Cape, Milligan. The color of the flowers is saturated pure red.

**Lypiranthus suaveolens.*—R. Br. pr. 325. D'Entrecasteaux Channel, Milligan.

*Caleana major.*—R. Br. pr. 329. North West Bay. Milligan.

*Calochilus campestris.*—R. Br. pr. 320. Oyster Cove, Milligan.

*Cryptostylis longifolia.*—R. Br. pr. 317. Oyster Cove, Milligan.

*Acianthus caudatus.*—R. Br. pr. 321. Oyster Cove and Flinder's Island, Milligan.

*Chætospora lepidosperma.*—C. tennissima, J. Hook. Fl. Tasm. II., 81 to CXL., non Stend. Glum. II., 162. Swanport, G. Story. In habit this plant approaches to other Chætosporæ, in its hypogynous scales rather to Lepidosperma.

**Potamogeton perfoliatus.*—Linné op. pl. 182. South Esk,

C. St. As yet neither flowers nor fruits are sent from Tasmania. The plant accords in foliage, however, with European specimens and with others from Gipps Land.

**Zostira uninervis*.—Forsk. Fl. Aeg. Arab. 157. At Southport, C. St. Much smaller than Z. marina, extending northward to middle Europe. The peduncles are very slender, and the fruit is very peculiar.

**Solanum vescum*.—F. Mueller in Transact. Phil. Inst. Vict., 1., 63. King's Island, Mount Goiran. The berries are edible.

**Veronica peregrina*.—Linné Spec. Plant, p. 20.

*Polycarpon tetraphyllum*.—Occurs among Dr. Milligan's plants from Flinder's Island.

# SOME CONTINUED OBSERVATIONS ON THE VARIABLE STAR $\eta$ ARGUS, AND THE SURROUNDING NEBULA.

[Read April 14th, by **Francis Abbott**, F.R.A.S., &c.]

Laid on the table a drawing of the object taken at three different periods, from 1834–7 up to February, 1868, the monographs of Sir John Herschel, taken at the Cape of Good Hope, and a record of the star from the time of Halley in 1677.

It will be remembered by some members of the society, who are interested in astronomical discoveries, that at the monthly meetings held in June, 1863, and March, 1865, some notes were read on the variable star $\eta$ Argus, and the surrounding nebula. At about the same time information connected with the subject was forwarded to the Royal Astronomical Society, who published it in their proceedings. This communication led to discussions on the subject in many scientific journals, and eventually to notices in standard works on astronomy, in some of which further observations and information have been solicited. It is to answer this enquiry that the original copy of this drawing and description have been prepared. Before proceeding with the notes on the present appearance of $\eta$ Argus, and its surrounding nebula, I purpose reading one or two paragraphs from recent publications in order to shew the interest which this object has excited among astronomers in Europe, from previous communications which have been sent; and it will appear clear to the present meeting by an inspection of the drawing, that fluctuations to a considerable extent have taken place since those articles were written. There is also reason to believe that other portions of the *via lactea*, as well as the nebula in question, are subject to motions by a system of acting forces calculated to produce them, and such as may offer opportunities for future observations.

Descriptive Astronomy.—Clarendon Press Series.—"The foregoing observations may be said to have relation to objects of a minor character, but we are not without at least one example of an important nebula undergoing peculiar changes. The great nebula in Argus, when observed by Sir J. Herschel in 1838, contained within its area a vacuity of considerable size. The star $\eta$, then of the 1st magnitude, was situated in the most dense part of the nebula, and was completely encompassed by nebulous matter. In 1863, we learn from Abbott, of Hobart Town, the star was entirely free from nebulosity, and only of the 6th magnitude. The observer also states that the outline of the vacuity materially different from the representation given by Herschel. Mr. E. B. Powell, of Madras, not only confirms these remarks generally, but also says distinctly that the nebula as a whole has varied much in brilliancy during the time it has been under his notice. We may evidently expect at some future time to hear of still more interesting discoveries in this department of sidereal astronomy."

THE HEAVENS, IMPERIAL OBSERVATORY, PARIS.—"We will bring this chapter to a close with a description of the most astonishing of all the phenomena of this kind,—namely, the variations of the star $\eta$ Argus; a singular star, which can be classed neither among the temporary nor among the variable stars. Towards the end of the seventeenth century this star was only of the 4th magnitude; less than a century after, in 1751, it attained the 2nd. Sixty years later it again descended to its first brightness, increasing anew until the year 1826. From that epoch it has passed through the most astonishing phases, oscillating between the first and second magnitudes, sometimes equal to a Crucis, then to a Centauri, surpassing Canopus, and approaching lastly to Sirius. The rapidity of these changes, their unequal periods, the long duration of this state of variability, the impossibility of finding a law more or less regular, all contribute to make this beautiful star one of the most curious objects of the sky. Our cotemporary astronomer, Mr. F. Abbott, who has followed the variation of $\eta$ Argus until now, informs us that after having, in 1843, attained the brilliancy of Sirius, it diminished progressively, passing through all the orders of intermediate magnitude between the first and sixth. In 1863 it was no longer visible to the naked eye. We are also informed that the nebulosity which surrounds $\eta$ Argus, like that of Orion, does not present any symmetry in its form or in its outline. It is situated in the Milky Way, in the midst of a region so rich in stars, that more than 1,200 have been counted in the area occupied by the nebula. The stars, however, do not form part of the nebulosity, but rather appear to be simply projected on it. Towards the centre of the nebula, and close to the star $\eta$, an opening of a lengthened and rounded form is noticed, which leaves in view the dark ground of the sky. This has been named by Mr. Abbott, a careful observer, 'the Crooked Billet.' The evidences of change in this nebula are even more decided than in that of Orion. This object indeed may supply a link of the greatest importance, for we read that the objects of which it is composed (not stars) 'are now of a larger character and more refulgent than nebulous matter in general.'"

I may mention here that this object is not seen at all in Europe, at the Cape of Good Hope and Madras it is only partially seen, as in one part of its revolution it dips below the horizon. The only other object of a known similar nature in the heavens at the present time is the great nebula in Orion, which for some years past has been rigidly examined with the most powerful instruments, and discussed by the best observers with a view of investigating some apparent fluctuations. What follows will show that those changes, although now established, bear but a feeble comparison to $\eta$ Argus and its nebula—the latter, however, will help to confirm what has been long suspected of the former. A paper on the nebula of Orion, read by the late Earl of Rosse before the Royal Society of London at the close of their last session, clearly shows that in the course of the last fifteen years considerable changes have taken place in that object—changes which cannot be attributed either to atmospheric difficulties of vision, or to alterations in the instruments, or in the observer's eye. If, therefore, it has taken so long a time, and been so difficult to trace the fluctuations in the nebula of Orion with the late Earl of Rosse's six feet speculum, and the fine refractor with 15 inches aparture of the late Professor Bond, how much greater and more apparent must be the alterations which are taking place in the nebula around $\eta$ Argus to be discovered with a five feet refractor with only four inches clear aperture. These singular and newly-discovered motions in nebulous masses at so remote a distance, are well calculated to open up new inquiries into the physical and dynamical laws which determine the conditions and relations of the forces which produce them. The singularity of the nebulous portion of this region has but recently been made a subject of systematic examination, and but for the observations and beautiful monograph of Sir John Herschel the pecularities attached to it might have remained unknown for a long time to come. In 1677 the star $\eta$ was recorded by Halley as of the 4th magnitude. Its maximum was first noted by Burchell in 1827, it being then of the 1st magnitude, and on the 30th March, 1863, it was found for the first time reduced to the 6th magnitude. Independent, however, of the variability of the star itself, there is a much more singular property belonging to the surrounding nebula, the particular features of which I now purpose to describe. The mutability of the nebula will be best made apparent by the accompanying drawing, which will at once shew the different forms of the dark space, and the relative position of $\eta$ Argus to it, from 1834-7 to 1868. It must not be considered, however, that the positions and characters here given are the only ones in which the object has appeared; a system of photographs only would be the means of assisting materially the recognition of a principle of irregularity pervading the whole structure. The missing portion of the nebulous matter, as compared with the Cape Monograph, may be thought by some to be owing to the want of a larger optical power, but when the same instruments have been used throughout this objection as to variability must fail to have any weight. The principal instrument used is a 5ft. equatorial by Dallmeyer. The building being situated in a garden the view of a small portion of the circumpolar stars is intercepted by fruit trees—to make good this want a five feet portable refractor by Varley is used in the open air, so that the object has been watched and noted throughout its entire revolution round the pole. The eyepieces in general use, and found most suitable for this purpose, are a comet one of 28, and orthoscopic of 45, and an annular micrometer of about the same power. A more powerful instrument, would, no doubt, at any one observation, alter the apparent features of the nebula, and render manifest changes of a somewhat different character to those here described. To witness these effects I wait the arrival of the Melbourne telescope, when I hope to have the opportunity of more correctly verifying these statements. The investigation of the fluctuations connected with the object η Argus and surrounding nebula appears not to require such refined and delicate observations as were bestowed upon Herchel's subnebulous region near the trapezone in Orion, by the late Professor Bond, and Earl of Rosse, nor are such powerful instruments necessary. Take, for instance, the position of the star η, as given by Sir J. Herschel, at the Cape of Good Hope, and note its position again, when in the dark space as confirmed by E. P. Powell, Esq., at Madras—and now for the third time compare its situation removed from the dark space altogether to quite a different portion of the nebula, and it will appear clear that the optical means employed have been ample, notwithstanding Mr. Powell was at first inclined to think that the fluctuations were only apparent, and owing to the inferiority of his instrument. The beautiful soft white light given out by the nebulous matter about η Argus appears to be produced, either from the increased magnitude of the stars, or the displacement of some of the nebulous mass, or probably from both, for in the former case it is difficult to say (only from its position) which is η Argus and which is not, there being so great a similarity in its size and that of some of the accompanying stars. On a clear fine night the object gives out fully twice as much light as that of the great nebula—nebicula major,—and about three times as much as nebicula minor, irrespective of size. In the twilight it appears as soon as a star of the second or third magnitude the light being white and more diffused—very like a small white woolly cloud on a blue sky, seen in sunlight. It is also seen in full moonlight, when all other nebulous matter is obscured. At present there appears to be no further diminution in the magnitude of the star below the 6th. Being in Melbourne on the night of the 25th March, 1865, which was a very fine one, and happening to look towards η Argus I fancied that the star appeared as a distinct point in the nebula. I immediately proceeded to the observatory, Mr. Ellery with his accustomed kindness allowing me to take possession of the equatorial, and on examining the object found the colour of the accompanying stars to be the same as before described to the society, and, with the comparative eye-piece, considered the star η to be 5·5. It was about this time that Mr. Tebbutt, of New South Wales, forwarded the result of his observations to the society, giving the star as 5·5. This appearance, however, must be considered only transitory, for many times since that period the star has not reached more than the 6th magnitude, and may be so estimated at present. The accompanying drawing was made with an inverting eye-piece, and taken 75° east of the meridian to prevent the unpleasantness of taking it near the zenith. If, therefore, the line of sight is brought to correspond with the south of the Cape Monograph the position of both drawings will be made approximately to agree at the time they were taken. In conclusion, I would observe that the particular interest taken in this object is owing to the star's inequality of motion, as to magnitude, and fluctuations in the nebulous mass. There are on record very many variable, as well as binary stars, whose change in magnitude and periods are correctly known. If we take the star α Centauri, not far from η Argus, the binary period is 78 years, or a little more than 4½° annually. R Leporis is Hinds' celebrated intense crimson star, max. 7, period 400 days. R Leonis is a ruby star, max. 5, min. 10, period 324 day. μ Cephei, fine deep garnet star, max. 3, min. 6, period 5½ years, β Persei moves from max. 2 to min. 4, period 2.86727 days. α Hydrae has a period of 55 days, &c. The period that has been given to η Argus is 46 years, and its variability from 1 to 4. This we have seen, however, is not correct, since the time of Halley in 1677 we have passed over 191 years, and not arrived at either the variability or period of η Argus, and for anything known it may disappear altogether: there are stars of that class on record. In 1604 a new star appeared in the east foot of Ophiuchus, but disappeared again in 1605, it was as bright as Venus and lasted but 15 months. In 1600 Kepler discovered a new star η in Cygnus, which he observed for 19 years, it faded away and then blazed out again several times before its final disappearance in 1621. With respect to the fluctuations that are taking place in the nebulous matter, it scarcely requires to be premised, that on a subject of this nature, the highest evidence that can be attained is a degree greater or less of probability. The only speculation to unfold it, which has hitherto thrown any light upon what is so legitimate and urgent a physical inquiry, constitutes the remarkable Nebular Hypothesis of Laplace.

# OBSERVATIONS ON DESMIDIACEÆ, WITH A LIST OF SPECIES FOUND IN TASMANIA.

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[By E. D. Harrop.]

These beautiful plants are of an herbaceous green color, and belong to the Cryptogamic division of the vegetable kingdom. They have attracted attention not only on account of the striking beauty and variety of their forms, but also by reason of the doubt as to their position, whether in the animal or vegetable kingdom, having caused considerable discussion amongst learned algologists. They are now almost universally assigned to the vegetable kingdom. The presence of starch in the ludochrome, and their mode of conjugating, constitute incontestable proofs of their vegetable organisation, notwithstanding the arguments of Professors Ehrenberg, Dalrymple, and Bailey to the contrary.

The principal arguments in favor of their animality are passed in review by Ralfs. They are,—first, the power of voluntary motion that they possess; second, their increase by voluntary division; third, the definite organ, possessed by some genera, in which active molecules appear to enjoy an independent motion, and the parieties of which appear capable of contracting upon its contents; fourth, the swarming motion which takes place at a certain stage of their growth. Other arguments have been advanced in support of this side of the question, and Ehrenberg went so far as to describe orifices, having protruding organs or feet immediately behind them, the basis of such organs being the moving molecules which are always opened at the ends of the Closterium. Notwithstanding the great improvement in the microscope since the time of this distinguished Professor, his observations have never been corroborated, and there is little doubt but that in this instance he allowed his imagination to overrule his general accuracy.

The power of motion and increase by self-division have now been abandoned as proofs of animality. It is manifest that they can transport themselves or, perhaps are transported under the subtle influence of light, from one place to another; for if a mass of Desmidieæ be placed in a glass vase, the one side of which is exposed to the sun's rays, we shall find, after a short time, that most of them have found their way to the illuminated side of the glass. Professor Bailey also writes,—"I have had species of Closterium and Euastrum confined in a compressor, in water perfectly free from other bodies, and they moved so fast that I found it impossible to sketch their forms with the Camera Lucida until they were killed." I have also observed this fact, but the movement always seemed to me of an irregular and involuntary kind, not nearly so vigorous as that of the Diatomaceæ, which Professor Max. Schultze has shown to be caused by protoplasm coming out of and re-entering minute perforations in the shell of the Diatom.

The most extraordinary phenomenon exhibited by some of the Desmidieæ is that swarming of zoospores mentioned above. I have observed it in the genera Docidium and Cosmarium. The zoospores in the Desmid appear to be endowed with tumultuous life, and the motion can be compared only to the swarming of bees. But although this motion has been claimed as a proof of animality, it has never been observed in any undisputed animal organism, whilst it has been frequently seen in several species of Confervoid Algæ. My own observation extends to a specimen of the Draparnaldia Nana obtained from the North Esk River. I made a note of the process at the time which I will here transcribe,—"Within each cell of the plant there were several small dark vesicles interspersed throughont the endochrome. These vesicles moved about. The branches of the plant fell from their pristine erect position as if overcome by the weight of the endochrome, or, as if the cell walls might be decaying. Then the endochrome in each cell divided into two portions, within each of which were some of the dark moving vesicles above mentioned. These two divisions of endochrome rapidly assumed an oval form, and obtained a surrounding of cellulose. Presently each evinced agitation as if suddenly endowed with life, and they commenced to revolve and beat from one side to the other of the containing cell as if anxious to escape. In a minute or two more their cell burst, and they shot out twirling round and round, rushing hither and thither as if in ecstasies at their newly acquired life power. After from five to ten minutes of this display of active life they became more sober and gradually assumed a quiescent state, some resting singly, but the greater number aggregating." It is a marvellous sight. You are watching a beautiful but inert plant; suddenly its branches droop, and as suddenly the contents of each cell became endowed with impetuous, tumultuous, exuberant life.

Each frond in the Desmidieæ is a single cell, and each cell has a suture, in some species hardly recognisable, in others the constriction is so deep as to extend almost entirely across the cell, the segments being joined only by a narrow isthmus giving it the appearance of two cells instead of one. That the frond is a single cell there can be no doubt, however much appearances in some species (*vide* Micrasterias, Euastrum, Cosmarium) may lead one to think otherwise. The proof that there is no septum between the segments is readily seen, for-if an opening be made in one of the segments the contents of both will escape thereout; and, moreover, we observe granules passing the whole length of the frond without impediment. A further proof lies in the conjugation of the cells and the formation of sporangia. The formation of one sporangium only at the point of contact of the two fronds does not accord with the notion of each frond having two cells.

The multiplication of cells by transverse division is full of interest, if only on account of its being the principal mode of reproduction in the protozoa. The process is exhibited as observed by me in a species of Closterium at page 4, fig. 2, of the accompanying book of illustrations. The fission takes place at the centre on the line of division of the two segments, the constriction becoming deeper and deeper until separation ensues. During the process the endochrome in each segment gradually separates and assumes the position of that in the mature plant, *vide* fig. 2, 6. On separation, the obtuse end becomes pointed, fig. 2, c., and lengthens out until complete development is attained.

It has been recorded that probably the Desmidiaceæ are truly reproduced only in two modes; the one by the escape of the granular contents immediately after the swarming process, and the other by the formation of sporangia, resulting from the conjugation of the cells. Late authorities mention four: first, cell division; second, the retraction of contents from parent cells and transformation of same into ciliated zoospores; third, division of cell contents into a number of zoospores; fourth, conjugation. My own observations on the Closterium striatolatum lead me to add another mode, viz., by the formation of a spore in each segment of the frond without conjugation, *vide* illustrations, page , figs 1, 1b. 1c. Whilst in coupling one sporanguim results from the connection of two fronds, we have here two spores in each frond. I made a large gathering of the C. Striatolatum this summer, and failed to find any of them in a state of conjugation, although it is commonly observed in this Desmid; whilst in all those sufficiently mature, I found spores as depicted in the figures, besides great numbers of them in the water free from the fronds. Fig. 1c. shows the frond ruptured and the spore ready to pass out. The ultimate history of these spores I shall endeavor to trace through the ensuing winter and spring. The universality of the Desmidieæ can be readily understood when we find their germs protected in indurated spore cases such as these. They may be wafted by the wind, or carried by various animals to any distance, when meeting with suitable conditions they burst into life. Darwin mentions fine dust clouds, which, on examination, were found to contain a large percentage of infusorial forms, falling on board the "Beagle," when several hundred miles from any land.

It is considered that those sporious bodies, called Xanthidium, found in flint are sporangia of Desmids. We have the exact fac-simile of them in the sporangia of the Cosmarium and Staurastrum. Sporangia and empty fronds have been found in tertiary deposits under the bones of extinct mammalia, which fact furnishes us with the strongest evidence of the powers of resistance to change of some of these humble and delicate organisms.

The uses of Desmidieæ are not much known. They evolve oxygen and tend to keep the water clear in which they exist. They also form food for all the entomostraca and many other animalculæ. A few months ago I lost a fine gathering of Closterium ascerosum, which I had put aside in a small bottle for the purpose of mounting, by having accidentally admitted a voracious Daphnia pulex; and I read that a recent observer saw a rotifer, the Notommata myrmeleo, seize a Closterium and suck the whole frond quite free of chlorophyll.

In giving the subjoined list of Desmidieæ I may mention that there are many species which I have not been able to recognise, especially of the genus Closterium. These apparently new species I have not ventured to name. At some future time I intend forwarding specimens and drawings to some competent algologist for identification and record.

For two or three years I have made gatherings of the Docidium verticellatum, figured at page 2. This species has not yet been found in England, although it is abundant both on the Continent of Europe and in America.

My gatherings have been made mostly from pools which are dug up during the summer. As they are plants whose favorite haunt is the open moor, and are taken in greatest numbers from perennial ponds, I have no doubt but that the Lake District and other likely places would render many rare, and perhaps new forms.

Most of the species here recorded will be found in the book of drawings. These figures are drawn under the Camera Lucida, and colored most attentively after nature.

## A LIST OF TASMANIAN DESMIDIEÆ.

Closterium lunula
,, striatolatum
,, acerosum
,, rostratum

Closterium setaceum
,, Ehrenbergii
,, acutum
,, 10 species, new

Docidium verticellatum
„ baculum
„ Ehrenbergii
„ truncatum
Hegalotheca dissiliens
Desmidium Swartzii
Cosmarium margaritiferum
„ pyramidatum
Euastrum ansatum
Staurastrum muticum
„ dejectum
Staurastrum gracile
„ bifida
Penium Bribisonnii
„ truncatum (?)
Micrasterias rotata
„ 1 U.S.
Pediastrum tetras
„ simplex
„ ellipticum
Auhistrodesmus falcatus
Sphœrozosma elegans.

# METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE AUTUMN QUARTER, 1868.

### Observatory, Hobart Town.

| Months. | Mean in Shade. | | Max. and Min. in Shade | | Mean Solar Intensity Black Bulb Insolated. | Mean Terrestrial Radiation on Grass. | Wind. | | Rain. | | Total Evaporation exposed to open Sky. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pressure. — Barometer corrected to 32° | Mean Temperature of Air. | Maximum of Air. | Minimum of Air. | | | Prevailing Currents. | Force. | No. of Days. | Tot'l Amount collected. | |
| | Inches. | ° | ° | ° | ° | ° | ° | lbs. | | In. | In. |
| March .. | 29·881 | 62·12 | 98 | 40 | 107·79 | 40·26 | N.W., S.E. | 72·61 | 7 | 0·47 | 5·54 |
| April .. | 29·933 | 55·71 | 75 | 36 | 92·85 | 42·38 | N.W., W. | 82·77 | 9 | 2·09 | 3·06 |
| May ... | 30·130 | 53·14 | 71 | 34 | 83·89 | 39·69 | N.W., S.W. | 46·30 | 5 | 0·44 | 1·61 |
| Mean.. | 29·931 | 56·99 | 81·3 | 36·6 | 94·84 | 40·77 | N.W., W. | 67·33 | 21 | 3·00 | 14·67 |

The Mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

## *Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Autumn quarter,* 1868.

March 10.—Guthrie's Topaz Plum ripe.
,, 15.—Tips of Hornbean commencing to turn yellow.
,, 20.—Colchicum autumnale in flower.
,, 24.—Coe's Golden Drop Plum ripe.
,, 25.—Horsechesnut leaves turning brown.
,, 30.—Oak leaves commencing to fall.
April 1.—Coe's Late Red Plum commencing to ripen.
,, 10.—Chinese Chrysanthemum commencing to flower:
,, 12.—Elm leaves commencing to fall.
,, 20.—Pyrus aucuparia (Mountain Ash) leaves commencing to fall.
,, 30.—Black Mulberry leaves commencing to fall.
May 10.—First Medlar ripe.
,, 17.—Coronilla glauca commencing to flower.
,, 24.—Ailanthus glandulosa leaves all shed.
,, 25.—Diosma alba commencing to flower.
,, 30.—Photinia serrulata commencing to flower.
,, 30.—Spiræa prunifolia commencing to flower.

Note.—The Colchicum flowered ten days later this year than last; the Hornbean, Golden Drop Plum, Horsechesnut, Oak, Chrysanthemum, and Black Mulberry were also from seven to ten days later, but Coe's Red Plum ripened eight days earlier.

# ROYAL SOCIETY.

## JUNE, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, 9th June, J. Davies, Esq., M.H.A., in the chair.

S. Wright, Esq., and J. R. Scott, Esq., M.H.A., who had been previously nominated by the Council, were, after a ballot, declared to be duly elected as Fellows of the Society.

The Secretary, Dr. Agnew, laid on the table the usual monthly returns, viz.:—

1. Visitors to Museum, during May, 452.
2. Ditto to Gardens, ditto, 1,477.
3. Plants, &c., received at Gardens:—From Messrs. Taylor and Sangster, Melbourne, 43 plants. From T. C. Carey, Esq., 47 papers seeds of plants indigenous to Western Australia. From the Botanic Gardens, Ceylon, 42 papers of seeds.
4. Times of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
5. Books and periodicals received.
6. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq., table, &c., for May.
2. Port Arthur, from J. Boyd, Esq., table for April.
3. Swansea, from Dr. Story, table for April.
4. Westbury, from F. Belstead, Esq., table for May.
5. Tamar Heads, from R. Henry, Esq., table for April.

The presentations to the Museum were as follows:—

1. From W. A. B. Gellibrand, Esq. Two recent specimens of the Native Tiger. *(Thylacinus cynocephalus.)*
2. From W. Lovett, Esq. A Diamond Bird. *Pardalotus punctatus)*, and a Mountain Thrush. *(Oreocincla lunulata.)*
3. From J. W. Graves, Esq. An English Partridge. *(Perdix cinerea.)*
4. From W. H. Price, Esq., Macquarie Plains. A Gannet. *(Sula Australis.)*

[In reference to this presentation Mr. M. Allport remarked it was a most extraordinary circumstance that a bird of this nature should have penetrated so far into the interior as the Macquarie Plains. It was evidently by its plumage a bird in its first year, and was probably easily captured, being unable readily to rise from the level of the ground on which it was found, as is the case with many long winged sea birds.]

5. From J. Forster, Esq. The skull of an Aborigine, picked up at "Brady's Look-out," Arthur's Lakes, the hunting ground of the Norfolk Plains tribe.

[This skull was found on comparison with others in the Museum, to be very similar in conformation to one obtained from the same locality some years back. In some minute particulars it differed from the Aboriginal type of skull from other parts of the colony.]

6. From J. Young, Esq. A crab caught at Kangaroo Point.
7. From Mr. F. Cotton, jun., Swanport. A lizard.
8. From J. Boyd, Esq., two Black Cockatoos, *(Calyptorynchus xanthonotus)*, shot at Port Arthur.

9. From H. Cook, Esq., Fac-Similes of the Warrants for the Execution of Mary Queen of Scots (1587), and of Charles I. (1648); also one of the "Act for establishing the Coronation Oath" (1689), and a Collection of Bulletins of the French army, 1812 and 1815.

The various items in this presentation were carefully examined by the Fellows present. Some of the bulletins, that for instance of the 16th June, 1815, and others, are of great historical interest. The warrants with the signatures attached are also well worthy of notice by the student of English History.

The Secretary then read the communication from Mr. Biggs, referred to at the previous meeting.

This was a detailed description "Of a Method of Microscopic Measurement," by means,—1st of a Camera Lucida of Mr. Bigg's own contrivance; and 2nd, of a movable scale of inches placed at such a distance that the reflected image of the object is projected upon it, and made to correspond with one or more of the divisions, the value of which has been previously ascertained by means of a stage micrometer graduated to, say—1-100 or 1-1000 inch, and applied in the same manner as described for the object.

In the absence of Mr. Biggs it was difficult to illustrate the various details given in the paper, the Society's microscope not being adapted for the particular kind of camera required. It was hoped that on a future occasion Mr. Biggs would be enabled to exhibit his method with his own instrument and appliances.

After reading the above paper, Dr. Agnew exhibited modes of minute measurement by means of English and French micrometers.

Mr. Allport brought forward a photograph of an interesting fossil ripple mark, which has been exposed in the working of a quarry at the commencement of the new Huon road, where it leaves Holbrook Place. The rocks in which it occurs belong to the carboniferous series, and the formation of this particular mark was doubtless due to the same natural causes which now affect mud-banks occasionally covered with water. The mud on which this mark was left by the receding waves must have had time to get quite hard (probably under the influence of a hot sun) before the next deposit of mud upon its surface, leaving a natural division between the two deposits, now plainly visible after the lapse of countless ages.

The usual votes of thanks having been passed, the meeting separated.

## JULY, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, the 14th July, His Excellency Colonel Gore Browne, President, in the chair.

The Secretary, Dr. Agnew, laid on the table the following returns:—

1. Visitors to Museum, during June, 374.
2. Ditto to Gardens during June, 672.
3. Plants received at Gardens:—From Mr. J. Harris, Melbourne, 36 plants. From Sydney Botanic Gardens, 36 plants. From Rev. G. Clarke, two cases of New Zealand Ferns.
4. Plants, &c., sent from Gardens:—To Messrs. Taylor and Sangster, Melbourne, one parcel of Bulbs.
5. Times of leafing, &c., of a few standard plants in Botanic Gardens.
6. Books and periodicals received.
7. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq.—Table and summary for June.
2. Port Arthur, from J. Boyd, Esq.—Table for May.
3. Westbury, from F. Belstead, Esq.—Table for June.
4. Tamar Heads, from R. Henry, Esq.—Tables for May and June.
5. Sydney, New South Wales, from G. R. Smalley, Esq., Government Observer, printed tables for March, April, and May.

Dr. Agnew read a letter from the Private Secretary enclosing a copy of a despatch received by His Excellency the Governor from the Duke of Buckingham, with a copy of "The Early Days of the Prince Consort," and one of "Leaves from the Journal of our Life in the Highlands," presented to the Society by Her Majesty the Queen.

[For these valuable presents a special letter of thanks has been sent through His Excellency, the President, for the purpose of being laid before Her Majesty.]

The presentations to the Museum were as follows:—

1. From Dr. Huston. Cap formed from husk of cocoanut, from Panama.
2. From Miss Fenton. A young Diamond Snake.
3. From Mr. E. Oldham. A halfpenny, William and Mary, and a half-farthing, George IV.
4. A Portuguese coin, 1795, from Mr. Bellette.
5. An Eagle, from Mr. Collis, of Recherche Bay, per Mr. Gould.
6. From Mr. W. Knight. A silver coin.
7. From Mr. John Buckland. Two English perch.
8. Dr. Agnew, model of a moccasin by Mr. Beamont.

After showing by the model how the moccasin was constructed, Dr. Agnew remarked he presented it as a sort of memento of the early days of the colony. At that period it was commonly used by bush travellers, and was a most comfortable covering for the feet. It was made from the thick part of the tail of the kangaroo, the hard and callous under surface of which formed the sole. Mr. Beamont could speak from long experience as to the comfort and convenience of moccasins, having on several occasions, before the existence of a road, walked in them across the island as far as Launceston, and over also to Macquarie Harbor (in 1817) where he had boen sent in order to test, by examination of the bush, if it were possible that prisoners could escape thence by land.

The Secretary reported the presentation to the Society of Mr. Gerard Krefft's pamphlet on the Fauna of Tasmania, and read several extracts from it.

Mr. Allport, after complimenting Mr. Krefft on his vauable contribution to the Fauna of Tasmania, read a paper in reply to some of his observations, especially (amongst other matters) in reference to the existence of two species of Thylacine. Mr. Allport thinks the evidence is not conclusive as to the existence of more than one.

Mr. Gould agreed with Mr. Allport's remarks as to the unity of species of the so called "Bull Dog" and "Greyhound" Thylacine. As to the Eagle (presentation No. 5) he coincided with Mr. Allport in considering it a new species. He had never seen one like it till last year, when he saw several pairs at Port Davey, which appeared to differ from those with which he was already acquainted, but unfortunately he was not then able to secure one as a specimen.

Mr. Dobson noticed that the Whip Snake was said by Mr. Krefft to be innoxious, and wished to know if that was the case.

Mr. Allport said, although venomous, it was practically almost harmless, on account of the small size of the mouth. It could not possibly inflict a wound through clothes.

Dr. Agnew stated he had dissected the heads of several of these snakes, and found that the poison gland was very large for the size of the animal. He did not think it safe therefore to look upon it as tolerably harmless, as the bite on some exposed part of the body such as the finger, especially in the case of children, might be attended by serious symptoms.

Mr. Gould observed that in addition to those catalogued, there was also the so-called Green Snake in the colony.

Mr. Graves corroborated Mr. Gould's statement, and adduced two instances where this snake had come under his immediate notice.

Mr. Allport after such evidence could scarcely doubt we had a Green Snake, but he had never seen one, and would be glad to have it known that he would give five pounds for a specimen. On this subject, too, he might say he would gladly give the same amount for any of our snakes measuring six feet or upwards.

Mr. E. D. Swan, in addition to the birds enumerated by Mr Krefft, mentioned he had seen of late years in the vicinity of the domain, and elsewhere numerous specimens of the Epthianura Albifrons.

Mr. Barnard read a paper on the Esparto or, Spanish Grass, in reference to its value for the manufacture of paper. He also gave some details as to the expense of erecting a paper mill, and alluded to the advantages to the community of the establishment of this and other manufactures.

Mr. Gould asked if calcareous soils, as stated in the paper, were absolutely necessary to the growth of the Esparto? If it grew on silicious soils, it would in all probability be a great boon to the colony, as most of our poor and waste lands were silicious, but if on the contrary it required a calcareous soil its benefit would be but limited.

Mr. Barnard replied that the *Economist* paper, the source whence he obtained his information, certainly spoke of calcareous or marly soils only.

Mr. Davies was glad to see so important a subject brought under notice, but would have been still more so had Mr. Barnard been able to lay before them more full and precise information. He had seen a very good account of the matter in *Lloyd's Newspaper* some time ago, but although desirous to refer to it on a subsequent occasion, he had been unable to do so, the paper having been mislaid. His impression, however, was that the Esparto Grass was said to grow well on poor silicious soils, and if so, it would prove to be a great boon to the colony, as said by Mr. Gould.

Colonel Crawford had also read on this subject. The grass was found on the coast of Barcelona, and he presumed therefore the soil was sandy. It was certainly poor and waste as the sailors used to go ashore and cut it without being interfered with.

Mr. Troup, D.A.C.G., said the soil along the coast of Barcelona, as in other parts of Spain, was very dry, and therefore in some degree perhaps different from that in Tasmania. Still, he knew it was very barren and useless, probably silicious and certainly not calcareous, or it would have been turned to some profitable use. He therefore thought our waste silicious lands would probably be very suitable for the Esparto.

Mr. Davies thought it was the duty of the Society to make further enquiries as to the product, the introduction of which might be of great benefit to the colony.

Mr. Gould agreed with Mr. Davies, and suggested that Mr. Barnard should be requested to obtain further information on the subject, which Mr. Barnard said he would be happy to do.

Mr. W. L. Dobson proposed a vote of thanks to Mr. Krefft for the early copy of his very interesting pamphlet, and to the gentlemen who had read such interesting papers.

Mr. Stephens seconded the motion which was carried: and the votes of thanks conveyed to the gentlemen present by His Excellency.

A vote of thanks was also accorded to the donors of presentations.

### PRESENTATION TO DR. AGNEW.

His Excellency the Governor said: Gentlemen, the ordinary business of the meeting being over, I am delighted to have the opportunity of closing it in a manner as agreeable to myself, as I believe it will be to every one present. I have been requested to convey to our Honorary Secretary a small token of the approbation of the Fellows, of the services which he has generally rendered to the society, and in recognition of his constant attention and care since he first entered upon the duties of the office. (Cheers.) All that has been done, all the valuable statistics that are laid upon the table every month, can only be collected, and arranged by much labor, which occupies time, and time which is extremly valuable to a man so constantly occupied as the Hon. Secretary is in the management of his own private affairs. Before Dr. Agnew undertook the office of Secretary, I believe these duties were performed by a paid officer, but that cost the society a very considerable amount, and our funds becoming diminished, we should have been unable to go on, had not Dr. Agnew come forward and undertaken the office. He had now performed the duty of the secretaryship for a period of seven years without remuneration, and it is known to all the Fellows, with how much care, attention, and courtesy he has performed it. I believe he enjoys the esteem and regard of all the members of the Society. I have much pleasure in handing to you, Dr. Agnew, a draft for £65, on behalf of the Fellows of this society, with a request that you will purchase a piece of plate, whatever you may like best, and that you will have engraved upon it the following inscription:—"Presented by the Fellows of the Royal Society of Tasmania, to James Wilson Agnew, Esq., M.D., as a token of their regard, and a mark of their appreciation of the valuable services rendered by him as Honorary Secretary of the Society. July, 1868.

His Excellency handed the cheque to Dr. Agnew amid cheers.

Dr. Agnew said: Your Excellency and Fellows of the Royal Society,—Even had I been more used than I am to speak in public I could scarcely have trusted myself to do so on such an occasion, and therefore hope you will excuse me if I read the few words which I have to say. The compliment which has just been conferred upon me is so great and so unexpected that I need not attempt to express the feelings, partly of pride, partly of misgiving which it has excited. To have gained the goodwill or approbation of a large and intellectual portion of his fellow citizens must be to anyone an unceasing source of satisfaction, and I can therefore truly say that nothing in public life has ever given me higher pleasure and gratification than your presentation of this splendid testimonial. I feel painfully, however, that my actual services have fallen far short of the value you have kindly put upon them, and, although I have at all times endeavoured to do what I could to promote the best interests of this society, and to keep up friendly relations with scientific bodies of a similar character in various parts of the world, I seem to have done so little, that I am conscious I owe the present compliment more to your kindness, than to any desert of mine. But if I have not been able to do as much as I could have desired, it has never, I think, been from want of will, and unless unforseen circumstances arise to render it impossible, I shall still feel great pleasure in acting as heretofore, until, at least, the services of some more efficient volunteer may be secured. I now beg to return my warmest thanks to all those who have interested themselves in the present movement. With the sum now placed at my disposal I shall, agreeably to your request, procure some article of value, on which I shall feel great pride in having engraved the inscription you have provided; and, I need scarcely add, in future years I shall rarely look upon it without being reminded of the present meeting, and of many a pleasant hour devoted to the service of the Royal Society of Tasmania.

The proceedings then terminated.

## AUGUST, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, the 11th August, His Excellency Colonel T. Gore Browne, President, in the chair.

Mr. C. T. Belstead, who had been previously nominated by the Council, was after a ballot declared to be duly elected a Fellow of the Society.

The Secretary, Dr. Agnew, laid on the table the usual returns for the past month, viz.:—

1. Visitors to Museum, 487.
2. Ditto to Gardens, 266.
3. Plants, &c., received at Gardens:—From Mr. J. Harris, Melbourne, 43 plants and 19 scions of fruit trees. From R. Henderson, Sydney, 16 plants.
4. Plants sent from Gardens:—To Mr. T. C. Wren, 55 plants and 76 species bulbs.
5. Time of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
6. Books and periodicals received.
7. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq.—Table and summary for July.
2. Port Arthur, from J. Boyd, Esq.—Tables for May and June.
3. Swansea, from Dr. Story.—Tables for May and June.
4. Westbury, from F. Belstead, Esq.—Table for July.

The presentations were as follow:—

1. From Mr. J. Dennett, Campbell-street, one silver coin (½ Dime), United States, America; one twopenny piece, George III.; two copper coins; a small medal, apparently struck in commemoration of the Battle of Albuera; also an Esquimaux dress from Behring's Straits.
2. From Mr. W. Young, Clarence, Plains, a grebe *(Podiceps poliocephalus.)*
3. From Mr. G. W. Linley, Oatlands, a chestnut-faced owl *(Strix castanops.)*
4. From Mr. M. Allport, a young Opossum from the pouch.
5. From Dr. Crowther, two Fish from Lady Elliott's Island.

The Secretary directed the attention of the meeting to the following books lately received as donations to the library.

1. From W. H. Archer, Esq., Registrar-General, by direction of the Government of Victoria, Notes of Progress of Victoria, 1835—1860, (parts 1 and 2), 1861-2-3-4-5-6 and 7, Statistical Register of Victoria and Calendar for 1855 (2 copies) Statistics of Victoria, 1867, Part 1st, Population; Part 2nd, Accumulation. Statistical tables, compiled for Dublin Exhibition, 2 sheets.
2. From Government of New Zealand, Statistics of New Zealand for 1866; Abstract of Principal Results of Census of New Zealand, 1867.
3. From Colonel Sir H. James, R.E., by direction of the Right Hon. the Secretary of State for War; Comparison of Standards of Length of England, France, Belgium, Prussia, Russia, India and Australia.
4. Reports and proceedings of Royal Society, London Linnean Society, Geological Society, Geographical Society, Asiatic Society, &c., &c.
5. From Dr. Milligan, Artisans' Report of Paris Exhibition of 1867. The Technologist Nos. 4 and 5 for 1866; Nos. 6 to 12 for 1867, &c., &c.,

The Secretary read a letter from Mr. Calder, the Surveyor-General, relative to the destruction of the Mutton Birds *(Puffinus brevicaudus)*, and their eggs on the islands in Bass' Straits, and suggesting that steps should be taken with a view of protecting them, at least during the breeding season.

Mr. M. Allport fully agreed with the statements in Mr. Calder's paper as to the ultimate effect of the wanton destruction now going on, both of the birds themselves and their eggs, and he hoped that some practical effort would be made for their protection.

Mr. Wright suggested that some controlling power by the agency of the police should be exerted.

Mr. Gould made some observations on the paper referring to a visit made by him to the "rookeries" at Port Davey, pointing out as interesting the habit of a small Petrel occupying to some extent the same burrows as the Mutton Birds, prior to their arrival, from which, however, they are at once expelled by the latter; and while agreeing in the object of the author, stated that some difficulties would arise in the adoption of steps to prevent the destruction of the Mutton Birds from the fact of the subsistence of the islanders in the Straits being dependent to a considerable extent upon the harvest of young birds procured by them. They were not contented, however, with this, but also destroyed the old birds and eggs, and preservation ought therefore to be provided.

The Bishop thought it would be well if the islanders themselves could be induced to take an intelligent interest in the preservation of a bird which was of vital importance to them.

Discussion ensued, in which Colonel Crawford, Mr. Barnard, and others took part. It was suggested that the law now in force to protect native game during the breeding season, might be made applicable to these birds. Finally, it was proposed by Mr. Barnard, seconded by Mr. Justin Browne, and carried, "That the suggestion contained in the paper should be remitted to Government, in order that action, if possible, might be taken in the matter."

Mr. F. Abbott read an interesting paper on "Spectrum Analysis, and its application to Science." The subject was subsequently illustrated by the exhibition of spectra from flames, in which various metals (Sodium, Potassium, Strontium, &c.,) were burned. The lines characteristic of each metal were well shown, and were examined with much interest by the Fellows present.

A vote of thanks to the authors of the papers, and donors of presentations having been accorded, the meeting separated.

# REMARKS ON MR. KREFFT'S "NOTES ON THE FAUNA OF TASMANIA."*

By Morton Allport, F.L.S., F.Z.S.

No one can deny that advantage is to be derived from scientific statistics concerning our natural history, especially from such pamphlets as that presented to the Society by Mr. Krefft, and our cordial thanks are due to that gentleman for his courtesy in so soon forwarding us a copy.

It was not to be expected that, with the limited collection before him, Mr. Krefft could make anything like an exhaustive list of our Fauna, therefore, as the Council of this Society will probably republish Mr. Krefft's notes in the Transactions, the value of those notes may be enhanced by calling attention to those parts to which additions ought to be made, and to some conclusions arrived at by the author which, in my opinion, are likely to prove erroneous.

In Placentalia, Mr. Krefft places first on the list *Canis dingo*, the Dingo, and adds " now extinct." What evidence has the author of its former existence in Tasmania? I never heard of one having been seen in this colony, or of the bones of one ever having been found; of course this is no proof that the Dingo never existed here, but I consider the presence of the *Thylacinus* and *Sarcophilus* (Tiger and Devil) as very strong presumptive evidence that the Dingo never did exist here, even without the negative evidence above mentioned. If the Dingo had been absent in Victoria and New South Wales, my conviction is that the Tiger and Devil would still be keeping down the excessive increase of Kangaroos and other herbivorous marsupials, instead of their bones only being found in the tertiary deposits of those colonies; in other words the Dingo being of a higher type and greater intelligence would, if present here, have rapidly driven out the marsupial carnivora, and we in Tasmania should have had to search our bone caves or other tertiary deposits (as they now have to do in the neighboring colonies) for proof of their former existence.

Referring to No. 8 on the list, *Mus Tasmaniensis* (Kr.), this may be the species common on Mt. Wellington, and which I have regarded as identical with *Mus fuscipes* (the dusky-footed rat) figured in part 3 of Gould's Mammals of Australia. In addition to this species two other small rodents are known, both from Port Davey, the skins of which were brought to me by Mr. Charles Gould. They are distinct from the Mt. Wellington species, and may belong to either the genus *Mus* or *Hapalotis.* Mr. Gould also mentions having seen, at Macquarie Harbour, a third species with unusually large eyes; this will also probably prove to be a new *Hapalotis.*

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*See Appendix.

In the list of Phalangers, Mr. Krefft has added *Phalangista Vulpina,* thus making separate species of our black and grey Opossums, though Mr. John Gould in his Mammals of Australia points out (as I think correctly) that the grey is only a variety of the black *(P. Fuliginosa.)* The black and grey breed indiscriminately and specimens may be obtained of all shades of colour from one to the other.

The beautiful little flying opossum *(Belideus Sciureus)* must now be added to this list, as it has been long acclimatised on the northern side of the island and is frequently met with.

Amongst the *Dasyure* family I scarcely think the evidence sufficient to warrant the division of the genus *Thylacinus* into two species. In the copy of his pamphlet which Mr. Krefft kindly sent me, and which I have now the honor to lay before the Society, he has included photographs of the skulls of *Thylacinus cynocephalus* and *breviceps* (so-called) but, while I admit that remarkable differences exist in these two specimens, I shall not be at all surprised if a large series of skulls should exhibit degrees of transition from one to the other and thus prove *T. breviceps* to be a variety rather than a species, and in connection with this subject I would remark that abnormal forms are constantly found in the marsupial skeleton.

Years ago I frequently heard of the short-nosed or bull-dog tiger, but could only get very contradictory accounts from the various settlers and shepherds who spoke of them. I have examined over 50 specimens in all, many of them carefully, and though I have found some variation in the shape of the skull, that variation has never been sufficient to divide the species, and, I am bound to say, no such marked difference as that exhibited in Mr. Krefft's specimens ever fell under my notice. To show how little reliance can (in a question of this sort) be placed in the statements of men who are not naturalists, I would call your attention to the two specimens of *Thylacinus Cynocephalus* from our Museum, now before you, a male and female. Some time back, a visitor from the Upper Derwent volunteered the information to our Curator, Mr. Roblin, that the larger specimen was a greyhound tiger, and the smaller (the female) a bull-dog tiger; the head is somewhat shorter and broader in the female specimen, and hence his conclusion. A strong argument against Mr. Krefft's short headed specimen being more than a variety is, I think, to be found in the fact that no distinct locality has ever been assigned by the settlers or shepherds for the habitat of the so-called bull-dog tigers, and very few, if any, of the same persons attempt to deny that the greyhound and bull-dog tigers mate together. If the one form were found in the dense scrubs of the north coast, and the other amongst the bleak ranges of the Upper Derwent, I could understand that a specific distinction really might exist, but no one pretends that this is the case, both are said to occur in all localities inhabited by the *Thylacinus*, and I would here draw attention to a fact so general that it may be looked upon as a law of nature, viz., that one tract of country is seldom, if ever, inhabited by very closely allied species of *Carnivora*, though varieties mating together may be common, and the reason probably is, that their habits and food being identical, such closely allied species would be perpetually in collision, and the weakest would inevitably be driven to a separate district.

In order to finally settle the question of one or two species, I am now endeavoring to obtain specimens of the so-called bull-dog tigers, and shall be glad of the assistance of Fellows of the Society residing in the country. To the Dasyure family another Antechinus (*A. leucopus*) is to be added.

Amongst the birds, to the order Raptores and family Falconidæ must now be added another eagle, killed at Recherche, and just added to the Museum, which does not quite answer to the description of any of those figured in Gould's *Birds of Australia.* It approaches more nearly to the Whistling Eagle (*Haliastur sphenurus*) than to any other, but is evidently distinct.

In Gould's recently published *Handbook to the Birds of Australia* the author has separated the New Holland Goshawk from the genus Astur, and placed it in the genus Leucospiza. The Grey Goshawk (*Leuscospiza Raii*) has never to my knowledge been seen in Tasmania, whereas the White Goshawk, now erected into a new species under the name *Leuscospiza Novæ Hollandiæ*, is very common. The latter name should, therefore, be substituted in Mr. Krefft's list for *Astur Novæ Hollandiæ.*

My friend, Mr. Edward Swan, our best authority on Tasmanian ornithology, has pointed out to me an omission in the order Insessores, viz., the white-fronted Ephthianura (*Ephthianura albifrons*). Mr. J. Gould in his handbook says it does not inhabit Tasmania, but Mr. Swan has seen it in several localities during the last three years, and at the present time it abounds at Cornelian Bay.

To the family *Cuculidæ* of the same order the Channel Bill

(*Scythrops Novæ Hollandiæ*) should be added as a specimen is a now in the Museum which was recently shot at Clarence Plains.

The sombre Swamp Quail (*Synoicus sordidus*) of which we possess one specimen shot in Tasmania must be added to the order *Rasores*, family *Perdicidæ.*

In the order *Grallatores*, family *Ardeidæ*, the Australian Egret (*Herodias Alba*) and the Nankeen Night Heron (*Nycticorax Caledonicus*) have been omitted, both birds are frequently found in Tasmania. The Land Rail (*Rallus pectoralis*) must also be added as it is constantly met with.

To the family *Anatidæ* of the order *Natatores* must be added the Maned Goose (*Chlamydochen jubata*) many pairs of which made their appearance on the upper part of the Derwent during the summer of 1866 and 1867.

As to fresh water fish, Mr. Krefft has asked me to furnish him with any forms besides those mentioned in his list, with which I am acquainted, and this I shall have great pleasure in doing during the coming summer and will place the list of names obtained from him before the Society.

I know of ten well marked indigenous species in addition to the four mentioned by Mr. Krefft; of these ten two belong to the *Genus Galaxias,* one to the Perches, and two to the Lampreys, but of the affinities of the remainder I am ignorant.

Although Mr. Krefft will not yet give us credit for the Salmon, he may assuredly add to his list the Trout (*Salmo fario*) the Tench (*Tinca Vulgaris*) and the Perch (*Perca fluviatilis*) all of which now abound in various localities.

Of the invertebrates to the class *Insecta* and order *Lepidoptera* a large number of species will have to be added as our moths are numerous, many of the forms being limited to small localities.

# ON THE ACCLIMATISATION OF ESPARTO GRASS FOR THE MANUFACTURE OF PAPER, AND THE ESTABLISHMENT OF A PAPER MILL IN TASMANIA. By J. Barnard.

A casual inquiry from a friend led me to search the files of a periodical, *Public Opinion*, for some account of Esparto grass, extracted from *The Economist;* and I was fortunate enough to meet with the following information on the subject, published in January, 1866, and which I thought might not be unacceptable to the Members of the Royal Society.

The important position which the lately discovered article of petroleum has rapidly taken in commerce is very interesting in itself, as suggesting how quickly the discovery of any new principle of motion would exercise an important influence on the present state of our industry. Another discovery has lately been made, which, though of less importance than that of petroleum, is still so interesting in character, and so useful as regards an important article of manufacture, as to be deserving of attention from those desirous of witnessing the introduction into Tasmania of a new industry.

The discovery alluded to is the applicability of the *Atocha,* or, as it is called in Spain, "*Esparto,*" to the manufacture of paper. Mr. Lloyd, of the Walthamstow Paper Mills, is stated to have had a great share in the merit of this discovery; and Mr. Mark, the British Consul at Malaga, has drawn up an interesting report on the subject, which has lately been made public in the commercial reports.

This grass is the produce of waste lands: it requires no expense in cultivation, and little in collecting. It is best propagated from the roots, and not from seed. It is perennial, and propagates of itself, and improves by a regular yearly gathering if plucked with sufficient care. Mr. Mark has devoted great care in his endeavours to ascertain the climate and soil which are favorable to the development of the plant; and it appears that the Atocha requires a decidedly hot and dry climate,—that it grows equally well in the plains and in the mountains to a moderate elevation,—and that as regards soil it flourishes both in calcareous and argillaceous soils, or when these soils are blended in the form of marl.

The greatest quantity is shipped from the provinces of Almeria and Murcia; but it is found, though in less abundance, in all the southern provinces of Spain.* It is also said to be plentiful in some parts of the opposite coast of Africa, and shipments were made from Oran to England.

Prior to the discovery of its being available for the manufacture of paper, the Esparto has been used in Spain as fuel, in the manufacture of ropes for mining and rigging, and for making baskets and matting. But the discovery of the valuable properties of the grass has made a complete revolution in the districts where it grows. Fortunes have been realised by individuals who were the proprietors of the land which produce it. The price has more than doubled, and is now estimated by Mr. Mark at £4 2s. per English ton on board. The greater part of the exports have as yet been directed to England, where in the brief space of three or four years the article has become a requisite of the highest importance, 160,000 tons having been, as it is said, imported into England in that period; and Mr. Mark estimates the present rate of annual export at 50,000 tons.

Mr. Mark estimates that, even at its present enhanced price, the Spanish grass will take a place with cotton, hemp, and wool as one of the staple and essential bases of manufacturing industry: and if this anticipation should be realised, in addition to the valuable resource which it seems likely to prove to our paper manufacturers, it will form an important element in trade between England and Spain; indeed, our shipowners have already largely profited by a discovery which has enabled them to find freights for their vessels employed in conveying coals and machinery to the mining districts in Spain, and which had hitherto, in the majority of cases, been under the necessity of returning to England in ballast.

From the *Quarterly Review* for April, 1868, are derived the following important particulars of this useful article. In 1852 a patent was taken out for Esparto as a substance for the manufacture of paper by Jean Antoin Farina, and again in 1854 and 1856 by James Murdoch and Thomas Routledge. Specimens of paper made from its fibre had previously been seen in the Algerine section of French products in the Exhibition of 1851. The *Ahkbar*, daily paper, has been printed in Algiers for years upon it; and it was introduced to the whole world in the "Exposition" of 1867, the catalogue of which is printed upon paper made from Esparto alone. The grass known to botanists by the name Stipa, or Machrochloa tenacissima, grows wild upon both sides of the Mediterranean for about five degrees of longitude. It comes on the European side from the east coast of Spain, principally from Carthagena, Almeria, Aquelas, &c., where it has long been used for making mats, ropes, soles of sandals, and the Iberian scourges of Horace (Epod. iv.); and it appears that any quantity of it may be obtained from Algeria, where it is a most abundant weed. It is white, and very tenacious in fibre; and, after rags, it is pronounced to be the best material yet discovered for the making of paper. The favour in which it is held by the British paper-maker may be gathered from the fact that between 65,000 and 70,000 tons of Esparto grass were imported into England for paper-making purposes in the year 1866.

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* Seeing that there is a difference of several degrees of latitude between the provinces of Spain where this grass flourishes and the colony of Tasmania, I confess that I am not sanguine as to whether this grass could be successfully acclimatised here; but, as its geographical range may be wider than supposed, a trial might at all events be made in certain localities most favorable for the experiment. Should it fail, it might doubtless prove a success in the adjoining colonies of Australasia.

This closes the information derived from the *Economist* and the *Quarterly Review*,—and here I should leave the subject were I not desirous of associating with it some remarks on the additional facilities likely to be afforded by the cultivation of this grass for the establishment of a paper mill.

At the present time, when there exists an earnest desire to do something to ameliorate the condition of the forlorn children who throng our streets, the introduction of a new local industry, affording means of employment, must be fraught with great public advantage whether regarded in a social, moral, or economical point of view.

When in England, in 1862, I visited several of the principal paper mills, for the purpose of gathering information as to the best processes of manufacture that might possibly prove useful in the event of this industry becoming established in Tasmania. I had in view the existence here of certain auxiliary means and appliances for this important object; viz., the great extent of water-power available along our creeks and rivers; the vocation given to the neglected and destitute in our population for the collection of rags and old clothes lying useless and worthless in almost every domicile,—and which would hence acquire, however small, a certain commercial value; the utilising the labour to be found in our penal, charitable, and kindred institutions in sorting and washing and preparing the rags for the mill. I assume that the resort to labour of this description should stop here, and that the actual manufacture of paper should be taken up at this point and be carried on in a separate and independent establishment, whether by the Government as a really reproductive work, employing the necessitous receiving eleemosynary relief from the State, who would thus be made to contribute to their own support, or by the agency of a public company influenced in its formation by adequate material encouragement, it is foreign to this paper now to discuss. One thing is clear that, at the present moment, were a paper mill to be worked altogether by coerced labour, independently of its skilled management and direction, the scheme would be free from the objection that has hitherto attached to the products of penal establishments, of their clashing and coming into competition with the fruits of free and unfettered industry.

Acting upon these views, I procured from an eminent engineering firm in London a design for a paper mill upon the most modern and improved construction, drawn to a scale of feet, with specifications, and reliable estimate as to its cost.

This mill would be capable of turning out 10 tons per week, working daytime only, or 20 tons working day and night as in England. The number of hands that it would employ—men, women, and children—would be about 120 in all, producing 20 tons of paper a week; or say 80 persons only, should 10 tons weekly suffice for the present demand, in addition to a general superintendent or manager, and such other staff as may be found necessary for the commercial part of the business.

A constant and unfailing supply of pure water is absolutely essential to the enterprise. If sufficient water-power can be obtained at a convenient site, considering transport, &c., it is undoubtedly the cheapest prime motive power.

The undertaking would require a capital of £25,000 to defray the entire cost of the necessary buildings and plant, all of the most complete and improved descriptions, full particulars of which I could detail if required.

I fear that I have prolonged this paper beyond reasonable limits, and will, therefore, to avoid further prolixity, simply add that the drawing of the works, with specifications and general statement, will, with pleasure, be placed by me at the service of any persons disposed to engage in this branch of industry.

Reverting, in conclusion, to the Esparto grass, some seeds might be procured from Europe, possibly through the British Consul in Spain, or even through the Secretary of States, upon the intervention of the President; and it would be in harmony, I conceive, with the scope of the Royal Society's functions to take the initiative for adding to the resources of the colony.

[Mr. Barnard has written to London for seeds, samples of the pulp, and specimen sheets of the Esparto paper. On arrival they will be laid before the Society.]

# SPECTRUM ANALYSIS AND ITS APPLICATION TO SCIENCE.

By FRANCIS ABBOTT, F.R.S.

At the monthly meeting in March, 1863, I brought before the Members of the Society some notes relative to the researches and early investigations into the phenomena and history of prismatic analysis.

At that time the researches of Professor Kirchoff, and Bunsen's appliances for the examination of colored flames, were but little known. Spectroscopes were scarce, and had not been introduced into the colony, consequently the only way of illustrating the paper was by means of colored drawings and some scientific apparatus. Many important discoveries have, however, been made since that period, especially from the results of Spectrum Analysis applied to the heavenly bodies, some of which will be rendered more apparent by the few following preparatory notes on the subject:—

It is well known that the laws of radiant light and heat are not only very similar but that these phenomena themselves are in all probability due to the same physical cause. "This analogy," says Balfour Stewart, "between light and heat as regards reflection, refraction, absorption, and probably polarization, will tend to show that radiant light and heat are only variations of the same physical agent, and also that when the spectrum of a luminous object has been obtained the separation of the different rays from each other is physicaly complete." In any region, therefore, of the visible spectrum the illuminating and heating effects are caused by precisely the same rays. If, for instance, we take the region of the spectrum near the violet, or most refrangible extremity, we find that luminous and chemical effects are produced, and in both cases the same rays are the active agents.

The solar spectrum has the property of being intersected by a series of dark lines, which are of great service in showing that there is only one active agent at one part of the spectrum, for towards the left extremity, or the red end of the spectrum, there is at the same time a heating and illuminating effect. These different rays possess distinctly heating, luminous, and chemical properties; there is, however, a great difference between the first of these and the two latter, "for the heating effect of a ray may be made the physical measure of the power which this portion of the spectrum possesses."

When light which has emanated from different sources is decomposed by a prism, the spectra which are obtained may differ in several important respects from each other, but all of them can be conveniently arranged in three general groups.

The special character which distinguishes spectra of the *first order* is that the continuity of the colored band is unbroken either by dark or bright lines. We learn from such a spectrum that the light has been emitted by an opaque body, and most probably by matter in a solid or liquid state. A spectrum of this order gives no knowledge of the chemical nature of the incandescent body from which the light comes.

Spectra of the *second order* are very different. These consist of colored lines of light, separated from each other. From such a spectrum we learn that the luminous matter from which the light has come is in the state of *gas*. Every compound body that can become luminous in the gaseous state without suffering decomposition is distinguished by a group of lines peculiar to itself. Substances *when in the state of gas* may be distinguished from each other by their spectra, providing the lines characteristic of the different terrestrial substances are known. The discoveries effected by Mr. Huggins have shewn that many of the Nebulæ are of gaseous composition, presenting the spectrum of bright lines separated by dark spaces.

The *third order* consists of the spectra of incandescent solid or liquid bodies, in which the continuity of the colored light is broken by dark lines. These dark spaces are not produced by the source of the light; they are produced by vapours through which the light has passed on its way, and which have robbed the light by absorption of certain definite colors, or rates of vibration; such spectra are formed by the Sun and Stars.

The spectra obtained from the Moon and Planets are unlike those produced by the Stars and Nebulæ, these latter not being original sources of light, but shining by reflection only; their spectra resemble, therefore, a modification of the solar spectrum.

Circumstances frequently unite in rendering investigations of this nature very difficult. On but few of those nights when the stars shine brilliantly is the air sufficiently steady for such very delicate observations. The light of the Stars is also very feeble, and requires a large instrument with an object glass of not less than eight inches aperture to gather up and concentrate to a focus the light from so small an object.

Another inconvenience arises from the apparent motion of the Stars caused by the rotation of the Earth. This difficulty has been overcome by the application of clock work, by which the telescope and observer are moved in a direction opposite to that of the Earth, by which means the object is kept within the focus of the instrument. In practice, however, it is found not easy to retain the image of a Star steady for any length of time exactly within a slit, the jaws of which are only 1-300th of an inch apart.

These difficulties being overcome, the light produced by a terrestrial substance is compared with the Stellar Spectrum by means of a prism fixed over one half of the slit, which receives the light reflected into it by a movable mirror that faces a clamp of ebonite, provided with forceps to hold the fragments of metals employed. These metals are rendered luminous in the state of gas, by the intense heat of sparks produced from a powerful induction coil. The light from these sparks is reflected into the instrument by means of the mirror, and a small prism being placed in connection with the larger one, which receives the light from the Star, the two spectra are visible in juxtaposition, by means of a small telescope; and thus the coincidence and relative position of the bright lines in the spectrum of the Star can be accurately determined by the bright lines in the metallic spectrum.

The spectroscope, as an instrument of research applied to scientific discovery, had never a more fitting subject to operate upon than that for the investigation of which the "Rigid Spectroscope" was contrived by J. P. Gassiot, V.P.R.S., and manufactured by Mr. Browning.

It is customary to speak of light, heat, electricity, &c., as "imponderable agents," or as gravity, a property manifested under certain conditions, Mr. Balfour Stewart, and Professor Tait, of Edinburgh, in technical language employed by the former, state: "That to this time it has been assumed, without proof, that the change in the co-efficient of terrestrial gravity does not in itself alter any other co-efficient of a body, and if a reason be asked none can be given, since gravity is a force of nature, of which men of science are confessedly ignorant." Now, if gravitation acts upon light so as to have a share in determining the position of any rays emerging from a prism, and forming a spectrum, a considerable change in the position of such a prism and of such light rays, involving a change in the force of gravitation, might cause a dark line in the spectrum to take a new position, more or less differing from that which it first assumed. The construction of this "Rigid Spectroscope," therefore, was to ascertain whether the position of the well-defined lines of a spectrum is constant, while the co-efficient of terrestrial gravity under which the observations are taken is made to vary.

The difficulties of making such a Spectroscope were very great, but they have been overcome, and a series of trials in Mr. Browning's workshop at Kew, and in the apartments of the Royal Society, have shewn that the variation of the D line is quite infinitesimal, in spite of great changes of temperature, and the removal of the instrument from place to place.*

Great interest has of late years been attached to the composition of Meteors, shooting Stars, and Bolides, to learn something of which, Mr. Alexander Herschel has constructed a direct-vision Spectroscope, fitted up with peculiar prisms for binocular arrangement, having a wide field of view and great power. This instrument, like the former, presented considerable difficulties of optical construction, which have been overcome by Mr. Browning.

Observers furnished with a Binocular Spectroscope may direct it like an opera-glass to that portion of the sky where the Meteors are expected to fall vertically towards the Earth, near (but not too near) the radiant point, where their course is foreshortened, and their apparent motion comparatively slow. As Meteors and shooting Stars make lines of light in the sky, each will give one or more lines of light in the Spectroscope. If, for example, we had a *Sodium* Meteor, it would give a *yellow* line in the sky, and a yellow line occupying the place of the Sodium line in the Spectroscope. If *Silver* were present, together with Sodium, the Meteor train would have a greenish tinge, and three lines would appear in the Spectroscope; viz., *yellow, green,* and *blue.* The spectral examination of the August Meteors has brought to light the fact of the existence of an extraordinary quantity of the vapour of Sodium in their composition.

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* Since these remarks were made on the Rigid Spectroscope, it has come to my knowledge that the instrument has been put on board of H.M. Ship Nassau, in charge of Captain Mayne, who was preparing to make a survey of the Straits of Magellan. A lengthy correspondence with some results has been received by J. P. Gassiot, Esqr., from Captain Mayne, which was placed in the hands of Pro. Stokes, and Mr. B. Stewart, from which it appears that the result at present influencing the variation of gravity does not exceed in passing from Lat. 45° to the Equator, a change of refraction for the yellow of the spectrum equal to about three-fourths of the interval of the D-lines, but more observations are required on the ship's return before it can be asserted that this apparent change is not due to known causes.

One point of importance to be ascertained by means of the "Meteor Spectroscope" is whether shooting Stars and their luminous trains, are composed of porous or of solid matter, and from Spectrum Analysis of the August Meteors the probability is that their composition is a mineral substance in which sodium is one of the principal ingredients.

From the study of mineral matter in a state of incandescent vapour, Spectrum Analysis has become of the greatest importance. Much is also learnt by observations on the light transmitted by or reflected from solutions of colored substances, however small the proportion in which they may be present, and in this way the Spectroscope has been very successfully applied to the Microscope. In examining the solutions prepared for this part of the subject there will be seen on the stage of the Microscope what have been named Fraunhofer's dark lines, which have been made by Professor Kirchoff the key by which this kind of writing can be deciphered and read.

When a ray of light falls upon a glass prism two different actions take place ; first the ray is refracted or bent out of its course, secondly, it is opened or spread out like a fan. This last action is called dispersion ; the dispersion of any part of the spectrum is proportional to the angular interval between two rays of nearly equal refrangibility ; both these actions depend on the substance employed in the formation of the prism. The size and character of a Spectroscope, the quality and number of prisms required, with such refracting angles as will produce the greatest dispersion with the least loss of light, should be regulated by the work required of it.

For the detection of metals, the spaces, and bands by which their presence is indicated, are conspicuously shown by an instrument that will display the chief lines of the Solar Spectrum, but there are many thousand lines discernible with more powerful apparatus, and many lines that appear single under ordinary circumstances, are found to be double or multiple when examined by superior means.

As a means of research, the application of Spectrum Analysis to the Microscope has not yet been attended with results of so decided a character as the study of mineral matter in a state of incandescence, although by such application we can detect and measure very minute quantities, and also compare the spectra of two solutions together.

It is much more difficult to learn what is and what is not characteristic in objects prepared for examination in this kind of analysis. For example, the exact position of the dark absorption bands in the spectrum obtained from blood is of an important character; it requires but little dispersion, and it is necessary to use the Micrometer for measurements, as well as suitable tests for proof. A solution of *Cudbear* in dilute alcohol yields two very faint bands in much the same place as those of fresh blood, but on adding ammonia one band becomes very dark and distinct, and the lower band disappears altogether. The addition of ammonia to a solution of fresh blood produces no such changes. If ammonia is added to a solution of cochineal, two absorption bands are produced in much the same position as those of fresh blood, and without care they might be confounded.

There are many objects like the foregoing which require careful and proper appliances; there are also many others of a much more characteristic kind. A striking spectrum is produced by a very dilute solution of *Permanganate* of *Potash*, which gives five well marked absorptions bands at about equal intervals in the green, and one or more in the blues. *Aniline Red*, *Madder*, coloured crystals, and many other substances, make easy and suitable objects for the Microscope, if the solutions are not made too strong, so as to destroy the delicate absorption bands. Sometimes these absorption bands are broad and indistinct, but in other cases narrow and well defined, and they are then much more characteristic.

The best known object for testing fine definition is a pale blue solution of Chloride of Cobalt in a concentrated solution of Chloride of Calcium. If the two lines are seen in the orange the definition must be very satisfactory.

To show the effects produced by means of Spectrum Analysis under the Microscope I have prepared very weak solutions of the following substances, viz.:—Permanganate of Potash, Aneline Red, Madder, and Cochineal; also fresh blood largely diluted. It must, however, be understood that a casual exhibition of these spectra is one thing and a scientific enquiry is another, for every part of the spectrum differs from the adjacent parts in refrangibility, and delicate bands can only be brought out by accurately focussing their own parts. It is, therefore, necessary to close the shutters in the Spectroscopes over the slit on the remainder of the object, by means of the two levers provided for the purpose, leaving only that portion of the spectrum visible which is under examination.

It will therefore appear clear that time will not admit of entering into these details, as the object intended this evening was more to explain and illustrate the principle adopted for ascertaining the characteristic spectra produced from the luminous vapours given off by the combustion of the following metallic substances. It will be remembered, however, that some of the coloured lines produced by these metallic vapours, although very characteristic and decided, are but of short duration.

1st. *Sodium.*—The spectrum-reaction of *Sodium* produces only one yellow line which is coincident with Fraunhofer's dark solar line D, for if the *soda* and the *solar* spectra were to fall one over the other the *yellow soda* line would exactly cover the dark solar line D. This is important, as it enables us to draw the conclusion respecting the presence of soda in the *Sun's* atmosphere.

2nd. *Lithium.*—The spectrum produced by this metal is very beautiful and quite characteristic. It consists of one intensely brilliant crimson line, and one less distinct orange line.

3rd. *Chlorate* of *Potassium.*—All compounds of this substance give a widely extended continuous spectrum, which contains only two characteristic lines, one in the outermost red, approaching the ultra-red rays, which coincides with the dark line A. of the *Solar* Spectrum, and a second line situated at the extreme end of the violet rays.

4th. *Nitrate* of *Strontia.*—The spectrum produced by *Strontia* is especially characterized by the absence of green bands. There are eight lines in this spectrum which are remarkable, namely, six red, one orange, and one blue. These *Strontia* bands are important both as regards their position and intensity.

5th. *Chloride of Barium.*—The spectrum of the compounds of *Barium* is the most complicated of the spectra of the alkalis. It is at once distinguished from all the others by two green lines, which are by far the most distinct, appearing the first, and continuing during the whole of the reaction.

6th. *Chloride of Calcium.*—This substance becomes gas at the temperature of flame, and gives a characteristic spectrum, which is distinguished from the foregoing spectra by a very bright green line and one intensely bright orange line, lying very near the red end of the spectrum.

There are other substances I propose to submit if time allows, viz., the metal *Thalium*, which produces the beautiful intense green *Thalium* line, very near the solar line D; Sulphur, which is various; and a mixture of the foregoing substances, which gives the characteristic lines of each in the spectrum.

In conclusion, it may be asked what new knowledge have we gained by prismatic analysis? We have seen that the Stars contain material elements and have a structure analagous to that of the Sun, also that their colours originate in the chemical constitution of the atmosphere surrounding them. The variable Star in Corona appears to show that great physical changes are in operation.* That the material of Comets is similar to the matter of the Gaseous Nebulæ, and may be identical. That Meteors, Bolides, and shooting Stars are of mineral composition. That our investigations of the universe are undergoing important changes, and that we require to wait patiently for more facts from the obvious teachings presented to us by new observations, doubting not that for wise purposes the Great Creator superintends the whole.

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* Mr. Huggins and Dr. Miller, in analysing this Star, found its light to form a spectrum unlike any other celestial body that has been examined. It is compound, and emanates from two different sources, each light forming its own spectrum, one of which, in the instrument, appears to be superposed over the other. One of these is formed by 4 bright lines. The other is analagous to the spectra of the Sun and Stars. It is known by the position of the bright lines in the spectrum that one of these luminous gases is *hydrogen*, and this taken in connexion with other circumstances together with the sudden outburst of the Star, has suggested the probability of the Star becoming suddenly enwrapt in a flame of burning *hydrogen*. This Star is No. 2,765 of Argelander's Zone, + 26°, and at the time of Argelander's sweep it was below the 9th magnitude.

2. Mr. Baxendell has supplied the following table of magnitudes :—

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1868. | May | 15, | at | 12h. | 0m. | G. M. T., | T. Coronæ | = | 3.6 or 3.7 | magnitude. |
| | ,, | 16 | ,, | 10h. | 30m. | ,, | ,, | = | 4.2 | ,, |
| | ,, | 17 | ,, | 11h. | 0m. | ,, | ,, | = | 4.9 | ,, |
| | ,, | 18 | ,, | 12h. | 30m. | ,, | ,, | = | 5.3 | ,, |
| | ,, | 19 | ,, | 12h. | 15m. | ,, | ,, | = | 5.7 | ,, |
| | ,, | 20 | ,, | 12h. | 13m. | ,, | ,, | = | 6.2 | ,, |
| | ,, | 21 | ,, | 12h. | 0m. | ,, | ,, | = | 7.3 | ,, |
| | ,, | 22 | ,, | 11h. | 15m. | ,, | ,, | = | 7.7 | ,, |
| | ,, | 23 | ,, | 10h. | 30m. | ,, | ,, | = | 7.9 | ,, |
| | ,, | 24 | ,, | 10h. | 30m. | ,, | ,, | = | 8.1 | ,, |

3. If we take in the objects from the Chinese Catalogue of Ma-Tuan-Lin, there are recorded about 20 of these remarkable Stars during the last two thousand years.

# METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE WINTER QUARTER, 1868.

### OBSERVATORY, HOBART TOWN.

| Months. | Mean in Shade. |  | Max. and Min. in Shade |  | Mean Solar Intensity Black Bulb Insolated. | Mean Terrestrial Radiation on Grass. | Wind. |  | Rain. |  | Total Evaporation exposed to open Sky. |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Pressure. — Barometer corrected to 32° | Mean Temperature of Air. | Maximum of Air. | Minimum of Air. |  |  | Prevailing Currents. | Force. | No. of Days. | Total Amount collected. |  |
|  | Inches. | ° | ° | ° | ° | ° | ° | lbs. |  | In. | In. |
| June .. | 29.943 | 47.12 | 31 | 31 | 74.70 | 35.77 | N., W. | 08.06 | 12 | 1.01 | 0.89 |
| July .. | 29.985 | 47.30 | 30 | 36 | 78.21 | 33.63 | N.W., S.W. | 41.61 | 16 | 3.76 | 1.59 |
| Aug. ... | 29.906 | 50.06 | 32 | 34 | 87.27 | 35.32 | N.W. | 17.68 | 8 | 0.33 | 1.45 |
| Mean.. | 29.944 | 48.16 | 31 | 36.6 | 80.06 | 34.57 | N.W. | 33.11 | 36 | 5.10 | 3.93 |

The Mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

## *Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Winter quarter, of* 1868.

June 10.—Maclaura aurantiaca leaves shedding.
,, 18.—Privet leaves shedding.
,, 30.—Black Mulberry leaves all shed.
,, 30.—Pyrus japonica commencing to flower.
July 10.—Arbutus unedo commencing to flower.
,, 14.—Garrya elliptica commencing to flower.
,, 16.—White Mulberry buds commencing to break.
,, 17.—Almond commencing to flower.
,, 30.—Crocus commencing to flower.
,, 31.—White Hyacinth commencing to flower.
Aug. 12.—Sambucus niger buds commencing to break.
,, 15.—Horsechestnut buds commencing to break.
,, 20.—Gooseberry buds commencing to break.
,, 26.—Elm (*Ulmus campestris*) commencing to flower.
,, 28.— Poplar (*Populus dilatata*) commencing to flower.
,, 30.—Apricot in full flower.

NOTE.—The early Narcissus and Snow-flake were at least a month later this year than last. The Privet was 5, Arbutus unedo 7, Garrya elliptica 8, W. Mulberry 6, Sambucus niger 10, Gooseberry 10, Elm 12, and Poplar 7 days later.

FRANCIS ABBOTT.

# ROYAL SOCIETY.

◆

## SEPTEMBER, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, the 15th September. The Hon. R. Officer, Esq., Vice-President in the chair.

The Secretary (Dr. Agnew) laid on the table the following returns for the past month :—

1. Visitors to Museum, 514.
2. Ditto to Gardens, 1,574.
3. Plants, &c., received at Gardens :—From Mr. W. Knight, jun., a collection of seeds gathered in New Zealand. From A. Verschaffelt, Ghent, Belgium, 391 papers, Seeds of trees, shrubs, herbaceous plants, &c.; 21 collections of florists' flowers, comprising 320 varieties.
4. Plants, &c., sent from Gardens :—For decoration of grounds of Asylum, New Norfolk, 82 Plants. To Mr. R. Henderson, Sydney, 23 Plants ; 8 varieties cuttings.
5. Tench supplied to Acclimatisation Society, Nelson, New Zealand, 7.
6. Time of leafing, &c., of a few standard plants in Gardens.
7. Books, &c., received.
8. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq., table and summary for August.
2. Swansea, from Dr. Story, table for July.
3. Westbury, from F. Belstead, Esq., table for August.
4. Tamar Heads, from R. Henry, Esq., table for August.
5. Swan Island, Goose Island, King's Island, Kent's Group, South Bruni, and Mount Nelson, monthly tables for the half-year ended 30th June, from the Marine Board.

The Secretary read a letter, from which the following is an extract, forwarded by Mr. Boyd, of Port Arthur, giving a detailed description by one of the overseers (Mr. F. A. Keith) of the remarkable tidal disturbance at Long Bay, of the 15th August, which, as is well known, occurred on the same day along the shores of all the Australian colonies and New Zealand :—"At 9 a.m., at low water, a huge wave was seen entering the Bay from the open sea, at the rate (as estimated) of about 11 or 12 miles per hour. The force was such that logs of heavy blue gum timber, which for years had been embedded in the sand, were washed ashore. A launch at anchor in the Bay, was driven for a distance of 100 yards, dragging her anchor and chain cable. A length of about 50 yards of a substantially built wooden jetty was swept away, and the rush of the water was so rapid that several men at work on the jetty only saved their lives by leaping into a launch which they had been engaged in loading. The water having thus risen to the height of *seven* feet, receded as rapidly to the extent of *ten* feet, the rise and fall together having occupied only fifteen minutes. During the day many waves of a similar character rolled into the Bay, the last, which occurred at a late hour, being even greater than the one described, but as its rise and fall were much more slow and gradual, the effects were not so remarkable."

The presentations to the Museum were as follow:—

1. From Mrs. Downing, Battery Point, a Scorpion, with 20 young ones; two specimens of Squid.
2. From Mr. Young, Bellerive, a Crab, and a specimen of Hippocampus sp.
3. From J. A. Moore, jun., Esq., New Norfolk, a Coot *(Fulica Australis.)*
4. From Mr. Williams, Sandy Bay, Egg cases of Sting Ray.
5. From Dr. Officer, a Platypus *(Ornithorynchus anatinus)*.
6. From F. G. Waterhouse, Esq., Curator, South Australian Institute Museum, Adelaide, 91 specimens (55 species) South Australian and other Birds.

This valuable presentation was received as a very liberal exchange for specimens sent to Adelaide from this Museum.

7. From Mrs. C. Meredith, 50 specimens (30 varieties) of Algæ, &c., from Prosser's Bay.

The Secretary directed special attention to the many beautiful forms of these algæ and corallines. A hope was expressed by some of the Fellows that Mrs. Meredith would still continue her labors and add to the value of her gift by future contributions of a similar kind to the Museum.

8. From Mr. William Norris, Franklin, Huon, Nest of an insect taken from the middle of the limb of a tree. The limb was two feet in diameter, and grew about 200 feet from the ground. An insect resembling a Wire-worm was found in the nest.

In reference to this nest Mr. M. Allport observed that the insect which produced it probably belonged to the family of hymenopterous insects, known as wood-boring wasps, as a somewhat similar, though smaller, structure made by one of the same family was common in decaying stumps in many parts of the colony. The nest has evidently been deserted some time, and the wire-like worm, mentioned by Mr. Norris, was probably an interloper. Though the delicate fabric has the appearance of being carved out of the solid wood it is really built of a sort of paper, composed of the woody fibres, worked into a paste by the insect. If a few more colonists would but imitate the good example of Mr. Norris, much interesting information as to our indigenous animals would soon be collected.

The Secretary directed the special attention of the Fellows to the splendid skeleton of the Black Fish (Gen. *Orca)* which had just been set up, and was so creditable to the skill, and practised manipulation of the curator, Mr. Roblin.

Mr. W. Knight, junr., read a paper on a specimen of chrome iron ore from the West Coast of the island. This was carefully analysed by Mr. Knight, who exhibited to the meeting the various compounds he had obtained from the ore, *i.e.*, bichromate of potash, chromic acid, chromate of lead, chromate of potash, sesquioxide of chromium, and hydrated ditto.

In the discussions which ensued no precise information was elicited as to the quantity of the ore which could be obtained.

Mr. Knight, at the request of the meeting, promised to procure further information as to the commercial value of the ore, and the facilities, if any, for obtaining it in quantities for exportation.

In proposing the usual vote of thanks, with special reference to Mr. Knight for his paper, and to Mr. Waterhouse of Adelaide, the mover, (Mr. M. Allport) fully concurred in the remarks previously made by Dr. Agnew, as to the credit due to Mr. Roblin for the preparation of the very fine skeleton of the Black Fish now before them.

The vote having been carried unanimously, and the chairman having specially thanked Mr. Knight, the meeting terminated.

## OCTOBER, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, the 13th October, His Excellency Col. T. Gore Browne, C.B., President, in the chair.

Dr. Agnew laid on the table the usual returns for the past month, viz.:—

1. Visitors to Musem, 589.
2. Ditto to Gardens, 1861.
3. Plants received at Gardens.
4. Time of leafing, flowering, and fruiting of a few standard plants in Gardens.
5. Presentations to the Museum, &c.

Also Meteorological returns from Hobart Town, Port Arthur, Swansea, Westbury, Tamar Heads, Adelaide, and Sydney.

The following presentations to the Museum were brought under notice:—

1. From H. M. Hull, Esq. A Whip Snake and two Lizards.
2. From H. L. Roberts, Esq. A War Dress made from cocoanut fibre.
3. From the Colonial Secretary. Specimen of Arfvedsonite from Swan Island, with report of assay.
4. From Mr. W. F. Pettard, junr. Twenty-one varieties Tasmanian Shells.
5. From Mr. Degraves. A Fossil from Sandstone.
6. From Mr. J. Young, Kangaroo Point. A Shark.
7. From Mr. Calvert. A small collection of Shells from King's Island.
8. From Mr. W. Legrand. Specimen of paper manufactured in Java from the inner bark of a tree.
9. From J. Boyd, Esq., Port Arthur. Skull and part of Skeleton of a small Whale, cleaned.
10. From J. Buckland, Esq. A fine specimen of the Argonaut *(Argonauta tuberculosa)* from Kent's Group.

There being no papers read, a conversational discussion took place, and after the usual vote of thanks to the donors of presentations, the meeting broke up.

## NOVEMBER, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, the 10th November, H. Bilton, Esq., in the chair.

The Secretary laid on the table the usual returns for the past month, viz.:—

1. Visitors to Museum, 517.
2. Ditto to Gardens, 1,859.
3. Times of leafing, flowering, and fruiting, of a few standard plants in Gardens.
4. Plants received at Gardens:—From Mr. T. C. Wren, Auckland, New Zealand, two large plants *(Cyathea medullaris and C. dealbata)*. From Mr. J. Simmonds, Launceston, 8 papers Seeds from Japan.
5. Seeds supplied from Gardens:—To Melbourne Botanic Gardens, seeds of *Chamærops excelsa* and *Pinus insignes*.
6. Tench supplied—To J. W. Graves, Esq., 17; to be forwarded to Auckland, New Zealand.
7. Books and Periodicals received.
8. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq., table for October, with summary.
2. Swansea, from Dr. Story, table for September.
3. Westbury, from F. Belstead, Esq., table for October.

The Presentations to the Museum and Library were as follows:—

1. From W. A. B. Gellibrand, Esq., Ouse River, a Snake.

With regard to this snake, Mr. Gellibrand, who considers it a new species, stated when presenting it to the Museum, that he had long known of its existence, and that it always inhabited the tea tree scrubs, close to the river, but from its habit of immediately taking to the water when disturbed, it was very difficult to kill.

The snake has since been ascertained to be a young specimen of the Black Snake of the colony *(Hoplocephalus Curtus)*.

2. From Mr. W. McDowell, Long Bay, two Centipedes from West Indies.
3. From Mr. R. Clarke, ship "Derwent Hunter," eye of a Whale, dried.
4. From Mr. O. Flexmore, a Lizard, 13 pebbles, and a Bank Note of United States.
5. From H. M. Hull, Esq., a Snake, two Iguanas, and specimens of Fungi from a Myrtle Tree *(Fagus Cunninghamii)*.
6. From Mr. Wintle, nest of a hymenopterous Insect, allied to the Mason Wasps.
7. From Mr. Harburgh, a Hermit Crab.
8. From J. Tebbutt, jun., Esq., Meteorological Observations made at the Peninsula, New South Wales, in the years 1863, 1864, 1865, 1866, bound.
9. From Mr. Hainsworth, a collection of Fossils from Table Cape.
10. From H. Bilton, Esq., a recent specimen of the Koala, or Native Bear *(Phascolarctos cinereus)*.

This was probably one of several of the same kind, which were introduced into this colony a few years ago from Victoria, where they are indigenous. The specimen now presented was killed on Mr. Bilton's property (about eight miles from the place where it was set free), by one of the labourers who found it sitting in the early morning on the top of a gate post. It is evidently full grown and well-nourished.

The Secretary read a paper by Mr. M. Allport, "On the Reasons for introducing the Perch into Tasmania."

Conversations having taken place, the usual vote of thanks was (on the motion of Mr. Gould, seconded by Mr. Swan) accorded to the author of the paper and the donors of presentations, and the meeting terminated.

# REASONS FOR THE INTRODUCTION OF THE PERCH INTO TASMANIA.

By Morton Allport, F.L.S., F.Z.S.

As many persons in this and other Australian colonies appear to consider that the perch introduced into the colony will prove injurious to other and better fish, it may be well to place upon record the reasons for such introduction.

The rivers of Tasmania are divided into two very distinct classes, namely, those which are ever flowing, and take their rise in mountain streams or large lakes, and those which only run during the winter months, and in summer consist (like many Australian rivers) of a series of deep still pools. The first class are admirably adapted for the rock and rapid loving salmonidæ, while the second form a suitable home for comparatively still water fish, such as perch, carp, and tench.

The differences in these two classes of rivers are well marked by their indigenous inhabitants, the lively grayling *(Prototroctes muræna)*, closely approaching the salmonidæ in character, being present in the first class and absent in the second. The Derwent, South Esk, and Huon, and many of their tributaries, are good examples of the one class—the Macquarie, the Jordan, and the Coal River, of the other. No sensible man would compare salmon or trout with perch, but while there are in Tasmania hundreds of miles of rivers, and acres of lagoons and backwaters devoid of good indigenous fish, which will not produce salmon and trout, and will produce perch, surely the latter fish ought not to be altogether excluded.

Whenever they become numerous the perch will doubtless find their way to the rivers which produce better fish, but it must be remembered that in any given river the localities suitable for trout and salmon in the early stages of their growth are by no means those frequented by perch, and if the perch should occasionally swallow a few hundreds of young salmon or trout, the old salmon and their congeners will never forget to return the compliment on a far larger number of perch which produce young in such numbers as to supply a vast quantity of valuable food, and it is an undoubted fact that the salmon and trout do more injury both to spawn and fry of their own species than the perch.

In numberless rivers, salmon, trout and perch, are all indigenous, and each would be plentiful if fairly treated by their worst enemy, man.

As a mere question of sport, the introduction of perch will be regarded as a boon by a large number of people, for while comparatively few will like to incur the expense of salmon fishing or undergo the labour required to attain proficiency in trout fishing, numbers will follow a sport like perch fishing, which yields much recreation at little cost. So keenly is this felt by many English fishermen that while strenuous efforts are being made to increase the number of trout in the Thames, and to re-establish the salmon there, large sums of money are expended in affording protection to the perch and other white fish.

But beyond all this one strong reason for the introduction of perch is to be found in the fact that for purposes of artificial rearing, no food is so easily grown for the young salmon and trout in their earliest stages as the minute perch fry, each of the latter being not one twentieth the size of their devourers when those devourers first begin to feed.

At Huningue and Stormontfield the young fish are fed with boiled liver, pounded fine, but however carefully used, a quantity of this liver escapes the fish, and gets lodged in the gravel, where it decomposes and soon becomes a fertile source of disease and death. Even the young larvæ of the common blow fly, hitherto used at the Plenty, though somewhat better than liver, are apt to escape the fish and die, doing more or less damage to the water, but if a stream from a pond in which perch are hatching by millions is led through the water containing young salmon or trout, all the perch fry which are not immediately bolted, roam quietly about, doing no harm to the water, till their inevitable turn comes.

A lot of young trout hatched from the egg and fed in this manner during the winter of 1867 were turned out at four months old with a loss of only 6 per cent.

# METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE SPRING QUARTER, 1868.

OBSERVATORY, HOBART TOWN.

| Months. | Mean in Shade. | | Max. and Min. in Shade | | Mean Solar Intensity Black Bulb Insolated. | Mean Terrestrial Radiation on Grass. | Wind. | | Rain. | | Total Evaporation exposed to open Sky. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pressure.—Barometer corrected to 32°. | Mean Temperature of Air. | Maximum of Air. | Minimum of Air. | | | Prevailing Currents. | Force. | No. of Days. | Total Amount collected. | |
| | Inches. | ° | ° | ° | ° | ° | | lbs. | | In. | In. |
| Sept. .. | 29·864 | 55·17 | 66 | 35 | 97·57 | 42·08 | N.W., S.E. | 40·36 | 12 | 2·71 | 2·48 |
| Oct. .. | 29·799 | 56·81 | 89 | 39 | 101·35 | 43·23 | N.W., W. | 97·80 | 10 | 1·83 | 4·94 |
| Nov. ... | 29·889 | 61·73 | 84 | 43 | 110·67 | 47·47 | N.W., S.E. | 75·16 | 5 | 0·16 | 5·77 |
| Mean.. | 29·850 | 57·90 | 79·6 | 39·0 | 103·19 | 44·26 | N.W. S.E. | 71·10 | 27 | 4·70 | 13·19 |

The Mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

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## *Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Spring Quarter of* 1868.

Sept. 8.—Ash commencing to flower.
,, 16.—Oak commencing to break into leaf.
,, 18.—Vines ditto ditto.
,, 19.—First Moutan Peony flower open.
,, 25.—Horse Chesnut commencing to flower.
,, 30.—Robinia Pseudo Acacia ditto ditto
Oct. 5.—Carpinus betulns commencing to leaf.
,, 12.—Ailanthus glandulosa ditto ditto.
,, 16.—Common lime ditto ditto.
,, 18.—Morus niger ditto ditto.
,, 22.—Ulmus campestris seeds beginning to fall.
,, 26.—Melia azederach commencing to leaf.
Nov. 1.—First ripe strawberry (British Queen) gathered.
,, 4.—Ditto cherry ditto.
,, 7.—Black mulberry in full flower.
,, 14.—Pomegranate commencing to flower.
,, 21.—First ripe raspberry (Red Antwerp) gathered.

The majority of the above plants were about seven days earlier this season than in 1867. Strawberries were 24 days, and cherries 21 days earlier.

FRANCIS ABBOTT.

# METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE SUMMER QUARTER, 1868-9.

OBSERVATORY, HOBART TOWN.

| Months. | Mean in Shade. | | Max. and Min. in Shade | | Mean Solar Intensity Black Bulb Insolated. | Mean Terrestrial Radiation on Grass. | Wind. | | Rain. | | Total Evaporation exposed to open Sky. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pressure. — Barometer corrected to 32°. | Mean Temperature of Air. | Maximum of Air. | Minimum of Air. | | | Prevailing Currents. | Force. | No. of Days. | Total Amount collected. | |
| | Inches. | ° | ° | ° | ° | ° | | lbs. | | In. | In. |
| Dec. .. | 29·739 | 61·55 | 84 | 40 | 107·23 | 47·74 | N.W., S.E. | 78·83 | 12 | 1·47 | 5·80 |
| Jan. .. | 29·747 | 62·40 | 74 | 43 | 106·45 | 48·92 | N.W., S.E. | 37·44 | 13 | 4·31 | 4.80 |
| Feb. ... | 29·877 | 62·52 | 88 | 44 | 103·34 | 50·32 | N.W., S.E. | 45·25 | 9 | 0·81 | 4·37 |
| Mean.. | 29·787 | 62·16 | 82 | 42 | 102·34 | 48·99 | N.W. S.E. | 53·84 | 34 | 6·59 | 14·97 |

The Mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

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## *Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Summer Quarter* 1868-9.

December 4th—First bunch Red Currants ripe
,, 5th—Common Privet commencing to flower
,, 8th—First bunch Black Currants ripe
,, 12th—Melia azederach commencing to flower.
,, 14th—Doyenne d'Ete Pear commencing to ripen.
,, 15th—Yellow juneating Apple ditto
,, 20th—Striped Margaret Apple ditto
,, 22nd—First Apricot (Royal) ripe
January 1st—Ditto (Roman) gathered
,, 6th—Grevillea robusta in full flower
,, 10th—First Jargonelle Pear gathered
,, 15th—Veronica augustifolia in full flower
,, 15th – Mulberries commencing to ripen
February 5th—Kerry Pippin Apple ditto
,, 6th—Windsor Pear ditto
,, 8th—Bon Chretien Pearditto
,, 18th—Common Ash commencing to shed seed
,, 22nd—Common Sycamore ditto.

NOTE.—The Red Currant was 11 days, Black Currant 10 days, Melia azederach 16 days, Doyenne d'Ete Pear 16 days, Juneating Apple 16 days, Apricot 16 days, Jargonelle Pear 12 days, Kerry Pippin apple 9 days, Windsor Pear 8 days, Bon Chretien Pear 12 days, and Ash 11 days earlier this year than last. The remainder were all a few days earlier.

FRANCIS ABBOTT.

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# REPORT

OF THE

# ROYAL SOCIETY

OF

# TASMANIA,

FOR THE YEAR

1868.

TASMANIA:
PRINTED AT THE "MERCURY" STEAM PRESS OFFICE, HOBART TOWN.

1868.

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**Her** **Majesty**

**The Queen.**

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| Abbott, Francis, F.R.A.S., F.R.M.S. | Hobart Town |
| Abbott, F., jun. | ,, |
| Adams, G. P. | ,, |
| Agnew, J. W., M.D | ,, |
| Allport, Joseph | ,, |
| Allport, Morton, F.L.S., F.Z. S. | ,, |
| Archer, William, F.L.S. | Cheshunt |
| Archer, William | Brickendon |
| Atherton, E. | Hobart Town |

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| Bilton, H. | Glenorchy |
| Barnard, James | Hobart Town |
| Barrett, Hugh S. | ,, |
| †Barry, Sir R., Puisne Judge | Melbourne |
| Bales, J. J. | Rokeby |
| Boyd, James, Civil Commandant | Port Arthur |
| Brent, John | Hobart Town |
| Butler, Henry | ,, |
| Butler, R. W. | Launceston |
| Button, W. S. | ,, |
| Butler, Francis | Hobart Town |
| Butler, J. | Bagdad |
| Bromby, Right Rev. C.H., Lord Bishop of Tasmania | Hobart Town |
| Bright, R. S., M.R.C.S.L. | ,, |
| Buckland, H. J. | ,, |
| Browne, Justin McC. | ,, |

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|---|---|
| Chapman, Hon. T. D., M.H.A. | New Town |
| Cohen, Joseph | Launceston |
| Cook, Henry | Hobart Town |
| Clark, J. M. | ,, |
| Creswell, C. F. | ,, |
| Cotton, Francis | Swanport |
| Crawford, Lieut.-Colonel | New Town |
| Crisp, Samuel | Hobart Town |
| Cruttenden, Thomas | Woodsden |

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|---|---|
| Davies, Ven. Archdeacon | Hobart Town |
| Davies, John, M.H.A. | ,, |
| Dear, R. E. | ,, |
| Dobson, Hon. W. L., M.H.A. | ,, |
| Dobson, H. | ,, |
| Dry, Hon. Sir R., M.L.C. | Quamby |
| Dunn, J. A. | Hobart Town |
| D'Emden, H. J. | ,, |
| Du Cane, His Excellency C. | Government House |
| | |
| Facy, Joseph | Hobart Town |
| Falconer, W. R., C.E. | ,, |
| Fenton, Michael | Fenton Forest |
| Fitzgerald, Robert | Hobart Town |
| Foster, John | ,, |
| | |
| Giblin, Thomas | Hobart Town |
| Gleadow, J. W. | Launceston |
| Gould, C., F.G.S., Government Geologist | Hobart Town |
| Gorringe, Thomas | Green Ponds |
| Grant, James | Tullochgorum |
| Greig, C. G. | Hobart Town |
| †Gunn, R. C., F.R.S., F.L.S. | Launceston |
| Graves, J. W. | Hobart Town |
| †Gellibrand, W. A. B. | River Ouse |
| | |
| Hall, E. Swarbreck | Hobart Town |
| Harris, Rev. R. D., M.A. | ,, |
| Hawkes, W. K. | Franklin Village |
| Hinsby, Henry | Hobart Town |
| Hopkins, Henry | ,, |
| Hunter, Henry | ,, |
| Huston, G. F. | New Norfolk |
| Huybers, A. | Hobart Town |
| Henry, W. | ,, |
| Hopkins, H., jun. | ,, |
| | |
| Irving, Professor | Melbourne University |
| Ingle, J. | England |
| | |
| Jackson, Adam | Ross |
| Johnston, William | Hobart Town |
| | |
| Kennerley, Hon. Alfred, M.L.C. | Hobart Town |
| Kermode, Hon. R. Q. | Mona Vale |
| Knight, W., jun. | Sandy Bay |

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| Langdon, Captain the Hon. W., R.N., M.L.C. | Montacute |
| Lewis, David, M.H.A. | Hobart Town |
| Lord, Simeon | ,, |
| Lowes, Hon. T. Y., M.L.C. | Glenorchy |
| Lord, James | Hobart Town |
| Lloyd, E. M., Lieut. R.E. | ,, |
| Maclanachan, James | Ballochmyle |
| MacNaughtan, Alexander | Hobart Town |
| Mather, J. B. | ,, |
| Maxwell, C. M. | ,, |
| †Milligan, Joseph, F.L.S. | England |
| Moore, J. A. | New Norfolk |
| Meredith, Hon. C., M.H.A. | Hobart Town |
| Morrison, Askin | ,, |
| Marsh, H. J. | ,, |
| McLean, Rev. R. | ,, |
| Mace, J. C. | Clarence Plains |
| Napier, G. R. | Hobart Town |
| Officer, Hon. Robert, M.H.A., Speaker | New Norfolk |
| Pillinger, J. | Antill Ponds |
| Peters, H. J. | Hobart Town |
| Robertson, William | Melbourne |
| Rooke, A. F. | Deloraine |
| Rout, William | Hobart Town |
| Roberts, H. L. | ,, |
| Salier, G., M.H.A. | ,, |
| Sharland, W.S., M.H.A. | New Norfolk |
| Solomon, Joseph | Hobart Town |
| Stephens, T., M.A., Inspector of Schools | ,, |
| Stewart, Alexander | Launceston |
| Story, J. F. | Swanport |
| Storie, Rev. J. | Hobart Town |
| Susman, L. | ,, |
| Stone, W. | ,, |
| Swan, E. D. | ,, |
| Scott, J., M.H.A. | Launceston |
| Scott, J. R., M.H.A. | New Town |
| Tonkin, H. B. | Hobart Town |
| Turnley, G. W. | Launceston |
| Troup, J. J., D.A.C.G. | Hobart Town |

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| **Walch, James** | **Hobart Town** |
| **Waterhouse, R. S.** | ,, |
| **Weaver, G.** | ,, |
| **Weston, W. P.** | **Norfolk Plains** |
| **Whitoomb, G.** | **Hobart Town** |
| **Whyte, Hon. James, M.L.C,** | ,, |
| **Wilson, George, jun.** | **Mount Seymour** |
| **Wilson, Hon. J.M., M.L.C.** | **Hobart Town** |
| **Wise, F. H.** | ,, |
| **Woolley, J.** | ,, |
| **Wilkins, A.** | **England** |
| **Webster, A. G.** | **Hobart Town** |
| **Wright, Stephen P. H.** | ,, |
| **Young, Russell** | ,, |

## MINUTES of the ANNUAL GENERAL MEETING of the ROYAL SOCIETY OF TASMANIA, held at the Museum, Macquarie-street, at 7 o'clock p.m., on the 28th January, 1869 : T. Giblin, Esq., in the chair.

THE Chairman having read the advertisement by which the meeting had been convened, called upon the Secretary to read the Report.

Before reading the Report, the Secretary informed the meeting that His Excellency the Governor had accepted the office of President of the Society, and had appointed the same gentlemen Vice-Presidents as last year, viz. :—The Hon. R. Officer, M.H.A. ; the Hon. T. D. Chapman, M.H.A. ; J. W. Agnew, M.D. ; and the Ven. Archdeacon Davies, B.A.

The Report for 1868 was then read.

It was moved by Mr. BILTON, seconded by Mr. NAPIER, and carried, "That the Report be adopted and printed for circulation amongst the Fellows."

The metting next proceeded to the election, by ballot, of four members of Council in place of those retiring by rotation, Messrs. H. Bilton and Justin McC. Browne being appointed scrutineers.

The following gentlemen were re-elected :—

The HON. R. OFFICER
H. J. BUCKLAND, ESQ.
T. STEPHENS, ESQ.
J. BARNARD, ESQ.

Messrs. H. Cook and F. Butler were elected Auditors of Annual Accounts.

Mr. Morton ALLPORT moved "that the thanks of the Meeting be accorded to the Honorary

Secretary Dr. Agnew, for the manner in which he had conducted the business of the Society during the year."

Mr. H. Bilton seconded the motion, which was carried with acclamation.

Dr. Agnew thanked the meeting for the compliment paid him, referring to the deep interest which he felt in the progress of the Society. He alluded to the very handsome pecuniary testimonial with which they had presented him a short time back, and said he had intended to have visited Melbourne during the summer, and to have purchased with it some lasting memorial of their kindness, as he had been requested to do. Circumstances had, however, prevented him from leaving Hobart Town up to this time, but he hoped he would shortly be able to go accross the straits, when he would take care to procure a suitable testimonial.

Mr. Buckland moved "that the thanks of the meeting be given to the chairman for presiding on that occasion."

Mr. Barnard seconded the motion, which was carried.

Mr. Giblin said he was very sorry to have to return his thanks to them for the compliment now paid him. He thought that one or other of the vice-presidents should have been present to take the chair, especially upon such an occasion. However, he thanked them for the vote accorded to him.

The proceedings then terminated.

# REPORT.

THE Session of 1868 was opened on the 24th March, by a paper from Dr. (now Baron) F. Von Müeller, Ph.D., F.L.S., &c., on the Phytography of Tasmania, which deserves especial notice for its intrinsic value, and from the fact that it was the only one received from our corresponding members. The following papers were also read at the monthly meetings :—"Some continued observations on the variable Star η Argus and the surrounding Nebulæ," by F. Abbott, Esq., F.R.A.S.; "Observations on Desmidiaceæ, with list of species found in Tasmania," by E. D. Harrop, Esq.; "Remarks on Mr. Krefft's notes on the Fauna of Tasmania," by Mr. Allport, Esq., F.L.S., F.Z.S.; "On the cultivation of Esparto Grass for the manufacture of paper and the establishment of a paper mill in Tasmania," by J. Barnard, Esq.; "Spectrum Analysis and its application to Science," by F. Abbott, Esq., F.R.A.S.; "On a specimen of chrome iron ore from the West Coast of Tasmania, with an analysis," by W. Knight, jun., Esq.; "Reasons for introducing the Perch into Tasmania," by M. Allport, Esq., F.L.S., F.Z.S.

The Microscopical Soirée, which was held in April, was as much appreciated as usual by the numerous visitors who were present.

The Meteorological Abstracts of the Observations furnished from the various stations in and round the island, for the last two years, are in course of compilation, and will, we expect, be published before the close of the current half year.

Our papers and proceedings for the past Session have been forwarded to various scientific societies and individuals in England, America, the neighbouring Colonies and elsewhere.

### COUNCIL.

No vacancy has occurred during the year. The required list according to rule XXXII., as amended at the last Annual General Meeting, has been exhibited in the Library for the last fortnight.

### FINANCE.

It is with extreme regret that the Council have to request the special attention of the Fellows to the course taken last year in reference to the grant-in-aid. This has been so inimical to the interests of the Society that it would appear to have been partly done through inadvertence, as no saving to the revenue of the colony was effected by it.

Since the year 1853 the Museum has always received from Government £200 per annum. But now, when the expenses have greatly increased, through the steadily increasing number of specimens, and when we consequently feel the greatest difficulty in keeping within our income, an entire quarter of the grant has been withdrawn and added to the amount voted for the gardens.

Our total income (viz., Government grant £150 to Museum, £450 to gardens, subscriptions £123, and sale of plants £86 1s. 7d.) has been £809 1s. 7d., which with £30 12s. 0d. in the hands of the Superintendent of the Gardens for payment of current expenses, £19 10s. 0d., arrears of subscriptions received since 31st December, and about

£30 still due, will give a total of £889 3s. 7d. The total expenditure and liabilities amount to £953 2s. 8d. leaving to our debit a balance of £63 19s. 1d.

As to the liabilities referred to, it may be mentioned that they are mainly due to a claim of £59 5s. 2d. from Messrs. Orger and Meryon, of London, on an account due some years ago, but which had been lost sight of from the fact of that firm having retired from business. A part of the claim has been paid off during the year.

## GARDENS.

Three hundred new plants have been added to our collection during the year, several of which are of great interest; on the other hand, it is to be regretted that owing to the unusually protracted drought, and an insufficient supply of water, many have died during the last few months. All the annuals have suffered severely, very few of the spring-sown having germinated, and such as did so, were dried up before flowering.

The beautiful white water lily *(Nymphæa alba)* has become established in the reservoir, where it has produced upwards of a dozen of its pretty blossoms during the season. *Nuphar lutea* also flourishes in the same situation, and will, doubtless, blossom next season.

During the past year two acres of ground, a portion of which is intended for the extension of the Pinetum, have been trenched, and many new and interesting pines are ready for planting as soon as the ground is sufficiently prepared for their reception.

The approximate number of visitors during the year was 20,624. As, however, the bye-law requiring visitors to sign their names has been relaxed, the entrance door is now left open, and so many persons enter unobserved, that the actual number probably exceeds that given.

### MUSEUM.

Considerable progress has been made in labelling and arranging the various collections during the year. Mr. Gould has presented several additional specimens procured during the geological survey of the Island, and has also devoted considerable time to the general arrangement of the Geological Department.

The whole of the Tasmanian birds, &c., have been removed from the general Museum, and re-arranged in the large room upstairs, which had been fitted up for the purpose as mentioned in last report. This room will be entirely devoted to the exhibition of Tasmanian specimens, and the arrangement will, it is hoped, be completed during the year. Skeletons of many indigenous animals have been prepared, and are now ready for articulating. A large skeleton of the blackfish (Orca sp.) has been prepared, articulated and mounted by the Curator, Mr. Roblin, and is a great acquisition to the Museum.

A few additions have been made to the Conchological collection, for which we are indebted to the liberality of Mr. Legrand.

Exchanges have been made with the Museum of the South Australian Institute (Adelaide), and further transactions of a similar character, advantageous to both Societies, will no doubt be continued.

The number of visitors has been 6836.

# *STATEMENT of the Funds of the ROYAL SOCIETY for the Year* 1868.

## RECEIPTS.

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Annual Subscriptions from 76 Members .. .. .. | 114 | 0 | 0 | | | |
| Arrears of ditto .. .. .. .. .. .. .. | 9 | 0 | 0 | | | |
| Total Royal Society .. .. .. .. .. | | | | 123 | 0 | 0 |
| MUSEUM—Grant in aid from Treasury .. .. .. | 150 | 0 | 0 | | | |
| Total Museum .. .. .. .. .. .. .. | | | | 150 | 0 | 0 |
| BOTANIC GARDENS—Proceeds of Sale of Plants, Fruit, &c. | 86 | 1 | 7 | | | |
| Grant in aid from Treasury .. .. .. .. .. | 450 | 0 | 0 | | | |
| Total Botanic Gardens .. .. .. .. | | | | 536 | 1 | 7 |
| Balance overdrawn at Commercial Bank .. .. .. | | | | 85 | 6 | 3 |
| | | | | £894 | 7 | 10 |

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| *Note.*—Dr.—To overdrawn Balance at Bank .. .. | 85 | 6 | 3 | | | |
| Amount due to Messrs. Orger and Meryon .. | 44 | 5 | 2 | | | |
| Ditto Wheatley & Co., to 30th June, 1868 .. .. | 14 | 9 | 8 | | | |
| | | | | 144 | 1 | 1 |
| Cr.—By Cash in hands of Mr. Abbott, for payment of Wages .. .. .. .. .. .. .. | 30 | 12 | 0 | | | |
| Subscriptions, arrears of, since received .. .. | 19 | 10 | 0 | | | |
| Ditto due .. .. .. .. .. .. .. .. | 30 | 0 | 0 | | | |
| | | | | 80 | 2 | 0 |
| Balance to Debit .. .. .. | | | | £63 | 19 | 1 |

## EXPENDITURE.

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Balance overdrawn at Commercial Bank, as per statement for 1867 .. .. .. .. .. .. .. .. | | | | 40 | 11 | 3 |
| Interest on overdrawn Account, 1868 .. .. .. .. | | | | 5 | 19 | 11 |
| ROYAL SOCIETY—Meteorological Instruments .. .. | 4 | 9 | 0 | | | |
| Printing and Advertising .. .. .. .. .. | 28 | 19 | 0 | | | |
| Postage, Parcels, &c. .. .. .. .. .. .. | 2 | 15 | 6 | | | |
| Collector's Commission, 5 per cent. on £123 .. .. | 6 | 3 | 0 | | | |
| Messenger for delivery of Papers to Members .. .. | 1 | 0 | 0 | | | |
| Expenses of Illumination in honor of Visit of Prince Alfred .. .. .. .. .. .. .. .. | 1 | 12 | 6 | | | |
| Library—Books and Stationery .. .. .. .. | 55 | 2 | 5 | | | |
| Total Royal Society .. .. .. .. .. | | | | 100 | 1 | 5 |
| MUSEUM—Curator's Salary .. .. .. .. .. | 125 | 0 | 0 | | | |
| Attendant's Wages .. .. .. .. .. .. | 52 | 0 | 0 | | | |
| Insurance .. .. .. .. .. .. .. .. | 6 | 7 | 6 | | | |
| Purchase of, and preparing Specimens .. .. .. | 7 | 1 | 6 | | | |
| Water Rate .. .. .. .. .. .. .. .. | 3 | 3 | 0 | | | |
| Fuel and Light .. .. .. .. .. .. .. | 3 | 7 | 5 | | | |
| Sundries and Petty Cash .. .. .. .. .. | 0 | 15 | 6 | | | |
| Camphor, Spirits of Wine, &c. .. .. .. .. | 7 | 8 | 7 | | | |
| Freight and Carriage of Specimens .. .. .. .. | 1 | 1 | 6 | | | |
| Fittings, Repairs, &c. .. .. .. .. .. .. | 11 | 7 | 11 | | | |
| Ironmongery .. .. .. .. .. .. .. .. | 4 | 1 | 2 | | | |
| Total Museum .. .. .. .. .. .. | | | | 221 | 14 | 1 |
| BOTANIC GARDENS—Salary of Superintendent .. .. | 150 | 0 | 0 | | | |
| Wages of Foreman, Labourers, &c. .. .. .. .. | 304 | 6 | 0 | | | |
| Tools and Repairs of ditto .. .. .. .. .. | 22 | 17 | 9 | | | |
| Freight and Carriage of Plants .. .. .. .. | 5 | 10 | 6 | | | |
| Stationery and Postage .. .. .. .. .. | 2 | 8 | 4 | | | |
| Forage .. .. .. .. .. .. .. .. .. | 3 | 19 | 5 | | | |
| Ironmongery .. .. .. .. .. .. .. .. | 8 | 15 | 2 | | | |
| Flower Pots .. .. .. .. .. .. .. .. | 10 | 8 | 0 | | | |
| Sundries .. .. .. .. .. .. .. .. .. | 15 | 7 | 0 | | | |
| Seeds .. .. .. .. .. .. .. .. .. | 2 | 9 | 0 | | | |
| | | | | 526 | 1 | 2 |
| | | | | £894 | 7 | 10 |

Audited and found correct, January 28th, 1869,
FRANCIS BUTLER, } *Auditors.*
HENRY COOK, }

## BOOKS PURCHASED & PRESENTED DURING 1868.

[*Books presented marked thus* *.]

Arts, Journal of Society of, Vol. 15, Parts 779 to 782; Vol. 16, Part 783 to 832, October 25th, 1867 to October 30th, 1868.
Arts, Society of, Transactions, 1866-7. 1 Vol. Bound.
Athenæum, Parts 478 to 489, Oct., 1867 to Sept., 1868.
*Acclimation, Soc. Imp. D'. Bulletin Mensuel, Tome 3, Nos. 2—12; Tome 4, Nos. 1—9. From the Society.
*Auriferous Drifts in Australia, by "Research." From the Author.
*Association, British, Report of, 1866. From the Association.
*Acclimatisation Society of New South Wales, Report for 1868.
*Builder, The, Nos. 202 to 212, Oct., 1867 to Aug., 1868. From Dr. Agnew.
Botanical Works of the late Robt. Browne. Vol. 2. Ray Society.
*Batman, John, Founder of Colony of Victoria, Life of. By J. Bonwick, F.R.G.S. From the Author.
*College, King's, London, Prospectus of, 1867. From Professor Tennant.
Conchologia Iconica. Parts 268 to 271.
*Chemische Untersuchung der Rinde von Petalostigma quadrilocular. By C. Franco. From Dr. F. Von Müeller, F.L.S.
*Cyclone, West India, 1867. By J.R. Eastman, United States' Navy. From F. Abbott, Esq., F.R.A.S.
*Desmidiaceæ, Observations on Tasmanian. From the Author, E. D. Harrop, Esq.
*Exhibition, Maritime of Havre, Prospectus, 1868.
*———— of Paris, 1867. Artisans' Report on, 1867. From Dr. Milligan.
*Esparto Grass, on the Cultivation of, for the Manufacture of Paper, and the Establishment of a Paper Mill in Tasmania. By J. Barnard, Esq. From the Author.
Florist and Pomologist, Nos. 71 and 72 for 1867. Nos. 1 to 10 for 1868.
*Fisheries, Salmon, England and Wales, 3rd, 4th, 5th, and 6th Annual Report of Inspectors of Ditto. Oyster and Mussel Fisheries, Report Board of Trade, 1867. Deep Sea and Coast Fisheries, Ireland, Report of Commissioners, 1866. Irish Fisheries, Report of Special Commissioners, 1866. Oyster Fisheries, Return to Order of House of Commons, 1867. From H. M. Government.
*Fauna of Tasmania, Notes on, by G. Krefft, Esq., F.L.S., C.M.Z.S., &c. From the Author.
*——————————, Remarks on, by M. Allport, Esq., F.L.S., F.Z.S.
Gardeners' Chronicle, Nos. 44 to 52, Nov. 2nd to Dec. 28th, 1867; Nos. 1 to 44, Jan. 4th to Oct. 31st, 1868.
*Highlands, Leaves from the Journal of Our Life in. From Her Majesty the Queen.
Intellectual Observer, Nos. 70, 71, 72. (The title of this periodical has been changed to that of "The Student.")
*Intelligencer, Walch's Literary. Monthly.
Journal, Practical Mechanics, Nos. 32 to 43. Nov., 1867 to Oct., 1868.
————, Silliman's American, of Science and Art, Vol. 44, No. 132, Vol. 45, Nos. 133 to 137.
———— of Agriculture, Nos. 18 to 24. (Title changed to that of "The Country Gentleman's Magazine.")
————, Quarterly, of Science, Nos. 17 to 20, Jan. to Oct., 1868.
*————s of House of Assembly, Tasmania. Vols. 11 and 13. From H.M. Government.
*Length, Comparisons of Standards of, 1868. By Col. Sir R. James, R.E. From the Right Hon. the Secretary of State for War.
*Military Surgery, being Circular No. 6 of Surgeon General's Office, Washington, 1866. From United States' Government.
Magazine, Country Gentleman's (Late Journal of Agriculture), Vol. 1, Nos. 1, 2, 3, 4, July to Oct., 1868.

*Meteorological Observations made at Sydney, New South Wales. From G. B. Smalley, Esq., B.A., Cantab., F.R.A.S., &c. Monthly Tables for 1868.
*—————————— taken at Windsor, New South Wales, from 1863 to 1866 inclusive. From J. Tebbutt, Jun., Esq.
*—————————— for Hobart Town. From F. Abbott, Esq., F.R.A.S.
*—————————— for Port Arthur. From J. Boyd, Esq.
*—————————— for Westbury. From F. Belstead, Esq.
*—————————— for Swansea. From Dr. Story.
*—————————— for King's Island, Swan Island, Goose Island, Kent's Group, Mount Nelson, and South Bruni. From the Hobart Town Marine Board.
Natural History, Annals and Magazine of, Vol. 20, Nos. 119, 120; Vol. 1, (fourth series), Nos. 1 to 6; Vol. 2, Nos. 7 to 10. Nov., 1868 to Oct., 1869.
*Naturwissenchaftlichen vereine, Abhandlungen herausgegeben vom zu Bremen, 1 Bd., 2 Heft; 4 Bd., and 5 Bd. From the Author, Dr. Sonder, Sec. to Natural History Society, Hamburgh, per Dr. F. Müeller, F.L.S., &c., &c., Melbourne.
*Natural History Society, Hamburgh. Ubersicht der Aeinter, 1865. From the same.
*Notes and Queries, No. 1, Jan., 1868.
*New Zealand, its Physical Geography, Geology, and Natural History, by Dr. Hochstetter. From New Zealand Government.
*Naturgeschichte, Archive fur, No. 6, 1865; Nos. 2, 3, 4, 5, 1866; Nos. 1, 2, 3, 1867.
*New Zealand, Statistics of, 1866. From New Zealand Government.
*Oyster Culture, Pamphlet on, by J. E. Calder, Esq., Surveyor-General. From the Author.
*Prince Consort, His Royal Highness the, Early Days of, 1868. Presented by Her Majesty the Queen.
Pterlography, Nitzschs. Ray Society, Vol. for 1866.
*Perch, Reasons for Introduction of, into Tasmania.
*Reports on Materials for a Medical and Surgical History of the American Rebellion, being Circular No. 6 of Surgeon-General's Office, War Department, Washington, United States. From American Government.
*Report on Epidemic Cholera and Yellow Fever in the United States' Army, 1868, being Circular No. —, Surgeon-General's Office, 1868, Washington. From the same.
*Report, South Australian Institute, 1867—8.
*Schriften der Koniglichen Physikalisch okonomischen Gesellschaft, 2, Nos. 1865, 2 Ditto, 1866.
*Society, Royal of Victoria, Transactions and Proceedings of, Part 2, Jan., 1868. From the Society.
*Student, The (late Intellectual Observer), Nos. 1 to 9, February to October, 1868.
*Society, Geological and Polytechnic, of West Riding of Yorkshire, Report for 1867.
*———— Royal, of London, Proceedings of, Vol. 14, Nos. 78, 79; Vol. 15, Nos. 80 to 93, inclusive. From the Society.
*———— Zoological of London, Part 3, 1866; Parts 1 and 2, 1867.
* ———— Zoological of London, Vol. 6, Part 6, Transactions.
Osteology of Sperm Whale *(Physeter macrocephalus)*
*———— Linnean, Proceedings of, Vol. 9, Nos. 35 to 39, Zoology; Vol. 9, Nos. 39 to 42, Botany.
*———— Geological, Quarterly Journal of, Vol. 23, Parts, 1, 2, 3, 4, 5, Nos. 89 to 93.
*——————, List of 1867.
*————, Royal Geographical, Proceedings of, Vol. 11, Nos. 1 to 6; Vol. 12, No. 1.
*——————————, Journal of, Vol. 36, 1866.
*——————————, Slip of Meeting of March, 1868.

*Osteology, Royal Asiatic, Journal of, Vol. 2, Part 2.
*————, Royal of Victoria, Vol. 9, Part 1, 1868.
*————, Acclimatisation, of New South Wales, 1867.
*————, Leeds Literary and Philosophical, Report 1867—8.
*Star Variable, η Argus, Observations on, by F. Abbott, Esq., F.R.A.S., &c. From the Author.
*Spectrum Analysis and its Application to Science. By the same.
*Statistics of Tasmania, 1867. From Her Majesty's Government.
*Statistical Register of Victoria, 1855.
*————, Notes of Progress of, 1835 to 1867.
*———— Summary, 1865.
*Statistics of Victoria, 1867. Part 1, "Population." Part 2, "Accumulation." Also Parts 3 and 4. From W. H. Archer, Esq., Registrar-General, Victoria.
*Tasmania, Notes on Fauna of, (3 copies), by G. Krefft, Esq., F.L.S., C.M.Z.S., &c. From the Author.
*Technologist, Vol. 1, New Series, Nos. 4 to 12. From the Editor.

## LIST OF OBJECTS PRESENTED TO THE MUSEUM DURING 1868.

Allport, M., Esq., F.L.S., F.Z.S.—Specimens of Fish *(Galaxias sp.)*, from Great Lake, Tasmania; Native Freshwater Perch; English Perch, bred in the colony from ova deposited this year; specimen of young Sawfish *(Pristis)*; a young Opossum from the Pouch.
Allison, Mr., Oatlands.—Two black Magpies *(Strepera fuliginosa)*.
Agnew, Dr.—Model of a Moccasin, by — Beaumont, Esq.
Browne, His Excellency Col. T. Gore, C.B.—A specimen of the Artificial Stone of which the new Wesleyan Church at Launceston is built. A Fossil from Sandstone.
Browne, Mrs. T. Gore.—Model of the Ohyawai Pah, Bay of Island District, New Zealand, in the attack on which 127 British soldiers were killed or wounded in five minutes on the 1st July, 1845.
Boyd, J., Esq., Port Arthur.—Two Black Cockatoos *(Calyptorynchus xanthonotus)*; Skull and part of Skeleton of young Black Whale cleaned.
Buckland, J., Esq.—Two English Perch *(Perca fluviatilis)*; a beautiful specimen of the Argonaut *(Argonauta tuberculosa)*, from Kent's Group, Bass's Straits.
Cotton, F., Esq., junr.—A Lizard.
Cook, H., Esq.—Fac-Similes of the Warrants for the Execution of Mary Queen of Scots (1587), and of Charles I. (1648); also one of the "Act for establishing the Coronation Oath," 1689; and a Collection of Bulletins of the French Army, 1812 and 1815.
Clarke, Mr. R., ship "Derwent Hunter."—Eye of Sperm Whale (dried).
Collis, Mr., Recherche Bay.—An Eagle.
Crowther, Dr.—Two Fish from Lady Elliott's Island.
Calvert, C., Esq.—A small collection of Shells from King's Island.
Dennett, Mr. J., Campbell-street—One Silver Coin (½-dime), United States; one Twopenny piece, George III.; two Copper Coins; a small Medal; an Esquimaux Dress from Behring's Strait.
Downing, Mrs., Battery Point.—Specimen of Squid, and a Scorpion with 20 young ones.
Dry, Sir R., Col. Secretary.—Specimen of Arfvedsonite, from Swan Island, with report of Assay.
Forster, J., Esq.—Skull of an Aborigine, picked up at Brady's Look Out, Arthur Lakes.
Fenton, Miss.—A young Diamond Snake *(Hoplocephalus superbus.)*

Flexmore, O., Esq.—A Lizard, 13 Pebbles of Quartz, &c., and an American Note.
Gellibrand, G., Esq.—Sample of Coal from Grey River, New Zealand.
Gellibrand, W. A. B., Esq.—Two recent specimens of the Native Tiger *(Thylacinus cynocephalus)*; a Snake (young specimen of *Hopolocephalus curtus.)*
Graves, J. W., Esq.—A Partridge *(Perdix cinerea)*.
Huston, Dr.—A Cap formed from husk of Cocoa Nut, from Panama.
Hull, H. M., Esq.—A Whip Snake *(Hoplocephalus coronoides)*, and two Lizards; a young Black Snake *(Hoplocephalus curtus)*; two Iguanas *(Cyclodus nigroluteus*, Krefft).
Harburgh, Mr.—A Hermit Crab.
Joseph, Mr. G., Single Hill.—A Coot *(Fulica Australis)*.
Lord, R. D., Esq., Oatlands.—A Pair of Mountain Ducks *(Casarca tadomoides)*.
Lovett, W., Esq.—A Diamond Bird *(Pardalotus punctatus)*; and a Mountain Thrush *(Oreocincla lunulata)*.
Linley, G. W., Esq., Oatlands.—A Chestnut-faced Owl *(Strix castanops)*.
Legrand, Mr.—Specimen of Native Paper from Java.
Maning, A. H., Esq.—A White Hawk.
Moore, J. A., Esq., New Norfolk.—A Coot *(Fulica Australis)*.
Meredith, Mrs. C.—Fifty Specimens (30 varieties), Algæ, &c., from Prosser's Bay.
McDowell, Mr., Long Bay.—Two Centipedes from West Indies.
Norris, Mr. W., Huon.—Nest of Hymenopterous Insect, taken from middle of the limb of a tree.
Oldham, Mr. T.—A Spur-winged Plover *(Lobivanellus lobatus)*.
Oldham, Mr. E.—A Half-penny, William and Mary; and a half-farthing, George IV.
Officer, Hon. R.—A Platypus *(Ornithorynchus anatinus.)*
Price, W. H., Esq.—A Gannet *(Sula Australis)*.
Petterd, Mr. W. F., jun.—21 varieties Tasmanian Shells, viz.: 10 Land, 2 Freshwater, 9 Marine.
Rex, Mr. George W.—A Grebe *(Podiceps poliocephalus)*.
Roberts, H. L., Esq.—A War Dress from Pleasant Island.
Smith, J. L., Esq.—A curious Fish, found on beach at Table Cape, Tasmania.
Sharland, Miss.—A Kingfisher *(Alcyone azurea)*.
Salmon Commissioners.—A young Salmon Trout *(Salmo trutta)*, found dead in the breeding ponds, River Plenty.
Wise, Mr. T.—Skull of Seal.
Williams, Mr., Sandy Bay.—Egg cases of Sting Ray.
Waterhouse, F. G., Esq., on the part of the Trustees of the South Australian Institute Museum, Adelaide.—91 specimens (55 species) South Australian Birds.
Wintle, Mr. S. H.—Nest of Mason Wasp.
Young, Mr. J., Glenorchy.—A Petrel; a Crab from Kangaroo Point; a Grebe *(Podiceps poliocephalus)*; specimen of Hippocampus; a small shark.

* * *

## PLANTS AND SEEDS RECEIVED AT ROYAL SOCIETY'S GARDENS, DURING 1868.

January 8th.—From Messrs. Taylor and Sangster, Nurserymen, Melbourne.—Box containing 24 Dahlias.
January 22nd.—From Dr. McCarthy, New Norfolk.—26 papers seeds received from Europe.
February 18th.—From Mr. C. Wren, Remuera, New Zealand.—Case containing 82 plants.

February 24th.—Mr. T. C. Carey, Western Australia.—16 Packets seeds.
March 20th.—From Mr. J. Harris, Nurseryman, Melbourne.—Case containing 47 Plants.
April 11th.—From Mr. R. Henderson, Nurseryman, Sydney.—Case containing 21 Plants.
April 18th.—From Mr. C. F. Creswell.—64 packets seeds from England.
May 15th.—From Messrs. Taylor and Sangster. —Case containing 43 plants.
May 16th.—From Mr. T. C. Carey, Western Australia. —47 packets seeds.
May 25th.—From Captain Clinch.—Seeds of Diosphros Kaki.
May 26th.—From Botanic Gardens, Ceylon.—42 packets seeds.
June 12th.—From Mr. J. Harris, Melbourne.—Case containing 36 plants.
June 20th.—From Botanic Gardens, Sydney.—Case containing 36 plants.
June 26th.—From Rev. G. Clarke.—Two cases containing collection New Zealand Ferns.
July 11th.—From Mr. J. Harris, Melbourne.—43 plants, 19 various Scions.
July 16th.—From Dr. J. Milligan, London.—37 packets seeds, distributed by London Horticultural Society.
July 20th.—From Mr. R. Henderson, Sydney.—Box containing 17 plants.
August 12th.—From Mr. William Knight,—About 10 varieties New Zealand seeds.
August 21st.—From A. Verschaffelt, Ghent, Belgium.—Box containing 391 packets seeds and 21 collections flower seeds.
September 1st.—From Mr. M. Allport.—Plant Nuphar Lutea.
September 19th.—From Melbourne Botanic Gardens.—Two cases containing 110 plants.
October 15th.—From Mr. C. T. Wren, Remuera, New Zealand.—4 plants Cyathea.
November 15th.—From Lieut. Howat.—Collection New Zealand seeds.
November 21st.—From Mr. J. Harris, Melbourne.—Case containing 13 plants.
December 4th.—From Dr. F. Mueller, Botanic Gardens, Melbourne.—8 packets seeds.
December 15th.—From Dr. F. Mueller, 9 specimens palm-seeds.

F. ABBOTT, Jun.,
*Superintendent R. S. Gardens.*

* * *

## PLANTS AND SEEDS SENT FROM THE ROYAL SOCIETY'S GARDENS DURING 1868.

January 25th, per "Wagoola."—To Ambroise Verschaffelt, Ghent, Belgium, 3 large plants, Dicksonia Antartica.
February 18th.—To A. Verschaffelt, per Windward.—10 small plants, Dicksonia Antarctica.
February 19th.—To Mr. J. Harris, Nurseryman, Melbourne.—Case containing 63 plants, 74 varieties bulbs, 50 packets seeds.
March 17th.—To Mr. R. Henderson, Nurseryman, Sydney.—134 varieties bulbs.
March 25th.—Messrs. Taylor and Sangster, Nurserymen, Melbourne.—133 varieties bulbs, 29 packets seeds.
March 25th.—Messrs. Handasyde and Co., Melbourne.—70 varieties bulbs, 62 packets seeds.
March 26th.—To Dr. R. Schomburgh, Botanic Gardens, Adelaide, 133 varieties bulbs, 29 packets seeds.
April 13th, per Harrowby.—To A. Verschaffelt.—12 plants Dicksonia Antarctica.
April 22nd.—To Messrs. Taylor and Sangster, Melbourne.—One case containing 40 plants.
April 28th.—To Mr. R. Henderson, Sydney.—Collection seeds.

June 17th.—To Messrs. Taylor and Sangster.—Packet bulbs.
July 30th.—To Mr. C. T. Wren, Remuera, New Zealand.—55 plants, 75 varieties bulbs.
August 8th.—To Mr. R. Henderson, Sydney.—24 plants, 8 varieties cuttings.
October 7th.—To the Botanic Gardens, Melbourne.—Packet seeds.
November 2nd.—To Mr. J. Dickinson, Port Arlington, Victoria.—30 varieties succulents.
November 2nd.—Mr. C. F. Creswell.—Collection seeds.
December 16th.—His Excellency Colonel Gore Browne.—180 packets Australian seeds.

F. ABBOTT, Jun.,
*Superintendent R. S. Gardens.*

## PLANTS SUPPLIED FOR DECORATION OF PUBLIC PLACES DURING 1868.

April 29th.—For decoration of the grounds of Cascade Invalid Depôt.—40 plants.
August 7th.—For decoration of the Asylum for Insane, New Norfolk.—82 plants.

F. ABBOTT, Jun.,
*Superintendent R. S. Gardens.*

## TENCH FISH SUPPLIED FROM THE ROYAL SOCIETY'S GARDENS DURING THE YEAR 1868.

| | |
|---|---|
| August 11th.—To Mr. Hiddlestone, Nelson, New Zealand... ... ... ... ... | 7 |
| October 23rd.—To J. W. Graves, Esq. ... ... ... ... ... ... ... ... ... ... | 17 |
| Total ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... | 24 |

F. ABBOTT, Jun.,
*Superintendent R. S. Gardens.*

# LIST OF PLANTS

## INTRODUCED INTO THE ROYAL SOCIETY'S GARDENS DURING THE YEAR 1868.

Abobra viridiflora
Acacia thozetiana
Acer neapolitana
Agnostus salignus
„ sinuatus
Amaranthus tricolor
Andromeda polifolia
Antirrhinum azoricum
Aphelandra Leopoldi
Aquilegia jacunda
Araucaria glauca
„ intermedia
Aralia parvifolium
„ reticulata
Arbutus glauca
Aristolochia Bonplandi
Aubretia purpurea
„ spathulata

Balsamita grandiflora
Banksia grandis
Berberis purpurea
„ fuschioides
„ illicifolia
Bignonia Wallichiana
Bocconia frutescens
Bomaria occulata
Bravoa germiniflora
Brachychiton Dalebachi
Bromelia Ananas
Browallia pendula
Bryonia alba
„ dioica

Caesalpinia Sappan
Calliprora lutea
Callabris columullaris
Camassia esculenta
Campanula Celsii
„ lacteum
„ Vidalli
Candollia sps.
Canna coccinea
„ Karsteniana
Caosia sps.
Carya Amara
Cassia dimidiata
Cathartocarpus Brewsteri
Celastrus angularis
Cerissa arduina
Chaenastus lanceolata
Cheiranthus maritimus bicolor
Chironia Lindlyana
Cinchonia Calisaya
Cissus Baudiniana
„ heterophylla variegata
Cladanthus chinensis
„ fragrans
Cocos plumosa
Coccoloba plattyclada
Coleus Gibsoni
Cordyline Banksii
Cotoneaster buxifolia
„ Hookeri
Crocus speciosus
Cuphea jorulensis
„ splendens
Cupressus glandulosa
Cyathea dealbata
„ medullaris
Cydonea Moorlosa
Cypella Herbertii

Dacrydium excelsum
Dianthus imperialis
„ laciniatus
Diosma uniflora
„ virgata
Diospyros spathulata
Dodonœa humilis

Edwardsia grandiflora
Elaeagnus fusca
„ hortensis
„ orientalis
„ sativa
Elaeocarpus grandis
Eranthemum tetragonum
Erica Andromedæ-flora
„ Bowiana
„ cerinthoides
„ concinna
„ sabana rubra

Fraxinus aurea
Forsythia Fortuni

Globularia salicina
Grevillea longifolia
„ microstylis
„ Hilli
Gypsophila saxifraga

Hardenbergia cyanea
„ Lindlyana
Hartogea capensis
Hedycaria dentata
Hemicyclia sepiaria
Hemigenia microphylla
Hibiscus tiliaceus
„ tricolor
Hypoxis stellata

Iberis Gibraltica
„ linifolia
„ pinnata
Iris alata
Ilex nobilis
Indigofera decora
Inhofia crispa
Ipomæa grandiflora
Ipomopsis atrorosea

Jasminum suavistrum
Juglans cineria
Juniperus attica
„ Dahurica

Kennedya Barclayana

Lachenalia erecta
Lantana var Goliath
„ „ Imperatrice Eugene
Larix Americana
Lavendula abrotanoides
„ dentata
Leichardtia Macleyana
Lentis rhyncocarpus
Leucocoryne alliacea
Libertia paniculata
Ligularia Kaempferi argentea
Ligustrum Calfornicum
„ undulatum
„ spicatum
Lonicera capitatum
Loxostylia alata

Magnolia cordifolia
„ gracilis
„ Soulangeana
Mimosa Caveana
Monetia barlereoideæ
Morinda citriodora
Musa ornata
Myaris jaqualis
Myoporum diffusum
Myrtus Bullatus

Nerine flexuosa
Nierembergia gracilis
„ frutescens

Nyctarinia selaginoides

Oenothera chrysantha
„ pumila

Olea Americana
„ sativa
Owenia venosa
Oxalis esculenta
„ hirta
„ liliana
„ tetraphylla
„ umbrosa
Oxera pulchella

Paliurus aculeatus
Panax sieboldtii
Passiflora Count Nesselrode
„ limbata
„ macrocarpa
Pelargonium Magnistipula
Phormium Colensoi
Physalis alkekengi
Pinus Pallasiana
„ Pindrow
„ sinensis
Pisonia Brunoniana
Pittosphorum Colensoi
Planera acuminata
Plectoria ventosa
Polygala attenuata
„ bracteata
Populus argentea
Prostanthera spinosa
Primula acaulis

Quercus Castana
„ coccinea
„ discolor
„ macrocarpa
„ prinos discolor

Raphiolepis ovata
„ salicifolia
Rhamnus papillosus
Rhodorrhiza florida
Robinia sophoroides
„ tortuosa

Sabal palmetto
Salix aurea
„ caprea variegata
Salvia africana
„ japonica
Sapindus sappea
Sciadophyllum speciosum
Scutellaria oblonga
Sedum carneum variegatum

Sedum crimæense
Silene retinoides
„ schafta
Sophora tomentosa
„ violacea
Spanoghia nephiloides
Sparto-cytisus nubigenus
Statice Thouini
Stenocarpus salignus
Strumaria crispa

Taxodium passerinoides
Thuja glauca vera
„ gracilis
„ nana
„ Skinneri
Tropœolum arvense
Tunica saxifraga

Urolepis cuprea

Verbena aubletia
Veronica buxifolia
„ ellliptica
„ Halkei
„ Leitchfieldi
„ selaginoides
Verticordia ericoides
Vesicaria gracilis
Vinca majæ-folia reticulata
Viola cornuta Czar
„ „ Mavue Queen
„ „ purple Queen
Viscaria elegans picta

Yucca crenulata
„ gigantea

Ziziphus macrocarpa
„ sinensis

## CAMELLIA.

Candidissima
Duchesse d'Orleans
Euterpe
Fimbriata
Henri Favre
Imogen
Iris
Imbricata alba
Jubilee
Modesta
Miniata
Perdita
Princess Bociocchi

## AZALEA.

Chelsoni
Colonel Napier
Criterion
Danielsiana
Georgiana
Ponticum aurea
Rawsoni
Rosea superba

## ROSES.

Acidalie
Beauty of Botany
Baron Adolph de Rothschild
Charles Lefebvre
Duchesse de Medini Cæli
Duc de Rohan
Duchess de Caylus
Duc de Cazes
Eugene Appert
George Prince
Gloir de Digon
Gloir de Santenay
Gloir de Vitry
Jean Rosan Krantz
John hopper
Lord Macaulay
Lord Clyde
Maurice Bernardin
Madame Charles Crapelet
„ Rivers
„ Boll
„ Derreux Douville
„ Clemence Joigneux
„ de Rougemont
Marechal Neil
„ Vaillant
Pierre Notting
Prince Camille de Rohan
Seur des anges
Souvenir de Compt Cavour
Triumph de Rennes
Vangueur de Goliath
Vicompt Vizier

## FUCHSIA.

Norfolk Giant

## GERANIUM.

Bijou
Black Dwarf
Cloth of Gold
Diadem
Flower of Spring

Fireball
Galatea
Golden Fleece
Huntsman
Mrs. Polock
Monsieur Margereal
Mountain of Light
Queen of May
Rosy Morn
Silver Queen

### PHLOX.

Andromeda
Borel
Diomede
Jeanne d'Arc
Madame A. Pothier
„ Ladoucet
Monsieur Chauviere
„ Gustave Duchesne
Monsieur Lacarte
Parmentiere

### APPLE.

Catshead Codlin
Golden Noble
Forge

### PEAR.

Compt de Lamy

### PLUM.

Mitchelson

### CHERRY.

Belle d'Orleans
Monstreuse de Bavy
Reine Hortense

### STRAWBERRIES.

Belle de Bordelaise
Eclipse
Oscar
Premier
Sir Harry
White Chilian

Olea Bouguilliert
„ Verdol

F. ABBOTT,
*Superintendent.*

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# APPENDIX.

91

# NOTES

ON THE

# FAUNA OF TASMANIA,

BY

GERARD KREFFT, F.L.S., C.M.Z.S., &c., &c.,

CURATOR AND SECRETARY OF THE AUSTRALIAN MUSEUM.

[Re-printed for the Papers and Proceedings of the Royal Society of Tasmania.]

A

# PREFACE.

The "Notes on the Tasmanian Fauna" have been printed for private circulation only, and principally with a few to draw the attention of our fellow colonists to the productions of their island which are not so well known as might have been expected from the length of its colonization.

It is to be hoped that any omissions on my part will be speedily corrected by resident naturalists; the fishes inhabiting the fresh water streams deserve particular attention, as only four species have been described, though probably many more exist.

According to some residents a species of Flying Phalanger is found in certain parts of the island, said to be introduced from Victoria; if this statement is correct, the animal should be included in the list.

# NOTES
## ON THE
# FAUNA OF TASMANIA.

The following remarks suggested themselves to the writer, after examination of a magnificent series of specimens of Natural History, collected in Tasmania by Mr. George Masters, assistant curator of the Australian Museum, Sydney, who visited Tasmania about a year ago, on behalf of the Trustees of that institution.

It will be observed that, excepting some of the Whales, specimens of all the Mammals known to exist in the island were brought together, not only their skins but also a fine series of skeletons, and young from the pouch, besides a large number of skulls, proving the existence of another species of Thylacine.

The following is a list of the Mammals collected :—

## PLACENTALIA,

Producing their young in a perfect state and having no pouch or skin-fold for their protection :—

| | | |
|---|---|---|
| 1. | *Canis dingo* | The Dingo (now extinct). |
| 2. | *Arctocephalus lobatus* | The Cowled Seal. |
| 3. | *Stenorhynchus leptonyx* | Sea Leopard |
| 4. | *Vespertilio tasmaniensis* | Tasmanian Bat |
| 5. | *Scotophilus microdon* | Small-toothed Bat. |
| 6. | *Nyctophilus unicolor* | Long-eared Bat. |
| 7. | *Hydromys chrysogaster* | Golden-bellied Beaver Rat. |

8. *Mus tasmaniensis*—(Kr.,) a new species of land-rat discovered by Mr. George Masters, on the banks of the Ouse River. Except this rat, all the animals mentioned are also found in Victoria and New South Wales.

## IMPLACENTALIA.

Producing their young in a very imperfect state and having a pouch or skin-fold for their protection.

### Section I.—*Marsupialia.*

### Wombat Family.

*Phascolomys wombat*......... The Tasmanian Wombat.

### KANGAROO FAMILY.

| | |
|---|---|
| *Halmaturus bennettii* | Bennett's Kangaroo. |
| *Halmaturus billardieri* | Tasmanian Wallaby. |
| *Macropus major* | Great or Common Kangaroo. |
| *Bettongia cuniculus* | Tasmanian Bettong |
| *Hypsiprymnus apicalis* | Tasmanian Rat-Kangaroo. |

### BANDICOOT FAMILY.

| | |
|---|---|
| *Perameles gunnii* | Gunn's Perameles. |
| *Perameles obesula* | |

### PHALANGER FAMILY.

| | |
|---|---|
| *Phalangista fuliginosa* | Black or Sooty Opossum. |
| *Phalangista vulpina* | Common Opossum. |
| *Phalangista viverrina* | Ring-tail Opossum. |
| *Dromicia gliriformis* | Thick-tailed Dromicia. |

### DASYURE FAMILY.

| | | |
|---|---|---|
| *Antechinus swainsonii* | Swainson's Antechinus. | |
| *Dasyurus viverrinus* | Common Dasyure or Native-Cat. | |
| *Dasyurus maculatus* | Spotted-tailed Dasyure or Tiger-Cat. | |
| *Sarcophilus ursinus* | Tasmanian Devil, | (fossil in N.S. Wales.) |
| *Thylacinus cynocephalus* | Tasmanian Tiger, | |

### Section II.—*Monotremata.*

| | |
|---|---|
| *Ornithorhynchus anatinus* | Duck-billed Platypus. |
| *Echidna setosa* | Hairy Echidna. |

A second species of Thylacine recently obtained by Mr. Masters, and which I have described in the Proceedings of the Zoological Society of London as *Thylacinus breviceps*, must be added to this list.

This is a smaller animal with a shorter head, and much larger teeth than the *T. cynocephalus*, and was well known to many of the old residents of Van Diemen's Land who distinguished the two kinds, so Mr. Masters assures me, by the popularnames of Grey-hound and Bull-dog Tigers.

Peculiar to the island are the following mammals :—

The Tasmanian Wombat.
Bennett's Kangaroo.
The Tasmanian Rat Kangaroo
Gunn's Bandicoot.
The Sooty Phalanger.
Thick-tailed Dromicia.
The Tasmanian "Devil"
The Two "Tigers"; and
The Hairy Echidna or Porcupine Anteater.

With the exception of the "Devil" and "Tigers" all have closely allied representatives on the mainland.

A colder climate always modifies species more or less, and we find the Mammals of Tasmania generally more robust, of larger size, and provided with thicker and darker fur, than those inhabiting New Holland. In the structure, however, of the skull and teeth, but little difference (except in size), is observable in Tasmanian specimens when compared with continental ones. Comparing the fauna of Tasmania with that of the Australian mainland, we arrive at the following result

The Dingo is extinct,—the Seals and Whales are the same as on our own coast. The insect fauna of the island not being very rich, there are but few insect-feeding bats, three species only are known to our twenty or more *Cheiroptera.* For similar reasons (the absence of indigenous fruits) no Flying-foxes occur, though if these marauders once found out the richness of Tasmanian plantations, they would soon wing their way across the Straits.

The peculiar Australian Rodent, the Water-rat, or Beaver-rat, is represented by a single species to five on the mainland. Some four or five and twenty other rats and mice are known to inhabit Australia, and only one kind Tasmania. The marsupial order is richer, but here again many species common to our south coast are missing. There are but three *Halmaturi*, while some forty species inhabit the continent.

Our ten or twelve "Kangaroo-Rats" and "Bettongs," have two representatives in Tasmania, both of which, curious to say, resemble in a most remarkable degree two West Australian species, so much so, that the one can only be distinguished from the other by a close comparison of their skeletons.

One would naturally conclude that a mountainous island like Tasmania, would be the very paradise of "Rock-Wallabies," but none are found there. The absence of the "Koala," or Native Bear, and of all the species of "Flying Phalangers," common in Victoria, is also unaccountable, the more so as the allied "Phalangers," better known as "Brush and Ring-tail Opossums," which subsist on similar food and live in the same forests, thrive well, and attain a great size in that Island.

The small marsupial insectivora allied to the genera *Podabrus* and *Antechinus*, are represented in the latter by a single species, though probably a second kind exists, as I received a new form from one of the islands of Bass's Straits, not long ago, which is perhaps also found in Tasmania.

The predominance of the large carnivora over all other animals, is most likely the cause of so limited a number of species; it is highly probable that many more kinds of Kangaroos once existed, and that they have been exterminated by the ferocious "Tigers" and "Devils" still plentiful in some of the wild districts; if so, their remains will tell whenever the bone-caverns are explored.

The monotremous section of the *Implacentalia* is represented as in Australia by the well known Platypus, and by an Echidna or Ant-eater which appears to differ from our own in nothing but the shorter spines and more hairy fur.

The birds observed amount to one hundred and sixty-two species as follows:—

## ORDER—RAPTORES.

### Family Falconidæ.

| | |
|---|---|
| *Aquila audax* | Eagle Hawk. |
| *Ichthyiaëtus leucogaster* | White-bellied Sea Eagle. |
| *Pandion leucocephalus* | White-headed Osprey. |
| *Falco melanogenys* | Blacked-cheeked Falcon. |
| *Falco lunulatus* | White-fronted Falcon. |
| *Ieracidea berigora* | Brown Hawk. |
| *Astur novæ hollandiæ* | New Holland Goshawk. |
| *Astur approximans* | Australian Goshawk. |
| *Accipiter torquatus* | Collared Sparrowhawk. |
| *Circus assimilis* | Allied Harrier. |

### Family Strigidæ.

| | |
|---|---|
| *Strix castanops* | Chestnut-faced owl. |
| *Athene maculata* | Spotted Owl. |

## ORDER—INSESSORES.

### Family Caprimulgidæ.

| | |
|---|---|
| *Ægotheles novæ-hollandiæ* | Little Morepork. |
| *Podargus cuvieri* | Morepork. |

### Family Hirundinidæ.

| | |
|---|---|
| *Acanthylis caudacuta* | Spine-tailed Swallow. |
| *Hirundo frontalis* | Welcome Swallow. |
| *Collocalia arborea* | Tree Swallow. |

### Family Alcedinidæ.

| | |
|---|---|
| *Alcyone diemenensis* | Tasmanian Kingfisher. |

### Family Artamidæ.

| | |
|---|---|
| *Artamus sordidus* | Wood Swallow. |

### FAMILY AMPELIDÆ.

| | |
|---|---|
| *Pardalotus punctatus* | Diamond-bird. |
| *Pardalotus affinis* | Allied Diamond-bird. |
| *Pardalotus quadragintus* | Forty Spotted Pardolote. |

### FAMILY LANIADÆ.

| | |
|---|---|
| *Strepera fuliginosa* | Sooty Crow-Shrike. |
| *Strepera arguta* | Hill Crow-Shrike. |
| *Gymnorhina organicum* | Tasmanian Crow-Shrike. |
| *Cracticus cinereus* | Cinereous Crow-shrike. |

### FAMILY CAMPEPHAGINÆ.

| | |
|---|---|
| *Graucalus parvirostris* | Tasmanian Graucalus. |
| *Pachycephala graucalus* | Grey-tailed Thickhead. |
| *Pachycephala olivacea* | Native Thrush. |
| *Colluricincla selbii* | Whistling Dick. |

### FAMILY MUSCICAPIDÆ.

| | |
|---|---|
| *Rhipidura albiscapa* | White-shafted Fantail. |

### FAMILY SAXICOLIDÆ.

| | |
|---|---|
| *Erythrodryas rhodinogaster* | Pink-breasted Wood Robin |
| *Petroica multicolor* | Scarlet-breasted Robin. |
| *Petroica phœnicea* | Flame-breasted Robin |
| *Petroica fusca* | Dusky Robin. |

### FAMILY MALURIDÆ.

| | |
|---|---|
| *Malurus longicaudus* | Blue Wren. |
| *Stipiturus malachurus* | Emu Wren. |
| *Sericornis humilis* | Sombre Sericornis. |
| *Acanthiza diemenensis* | Tasmanian Acanthiza. |
| *Acanthiza magna* | Great Acanthiza. |
| *Acanthiza chryssorrhœa* | Yellow-rumped Acanthiza. |
| *Calamanthus fuliginosus* | Striated Calamanthus. |

### FAMILY MOTACILLIDÆ.

| | |
|---|---|
| *Anthus australis* | Australian Pipit. |
| *Sphenœacus gramineus* | Tawny Grass-bird. |

### FAMILY FRINGILLIDÆ.

| | |
|---|---|
| *Estrelda bella* | Fire-tail. |

### FAMILY MERULIDÆ.

| | |
|---|---|
| *Cinclosoma punctata* | Spotted Ground Thrush. |
| *Oreocincla lunulata* | Mountain Thrush. |

### FAMILY CORVIDÆ.

| | |
|---|---|
| *Corvus australis* | White-eyed Crow. |

### Family Meliphagidæ.

| | |
|---|---|
| *Meliphaga novæ hollandiæ* | New Holland Honey-eater. |
| *Meliphaga australasiana* | Tasmanian Honey-eater. |
| *Glyciphila fulvifrons* | Fulvus-fronted Honey-eater. |
| *Ptilotis flavigula* | Yellow-throated Honey-eater. |
| *Anthochæra inauris* | Wattle-bird. |
| *Anthochæra mellivora* | Brush Wattle-bird |
| *Acanthorhynchus tenuirostris* | Cobbler's Awl. |
| *Melithreptus validirostris* | Strong-billed Honey-eater, or Cherry-picker. |
| *Melithreptus melanocephalus* | Black-headed Honey-eater. |
| *Myzantha garrula* | Miner. |
| *Zosterops cærulescens* | Grey-backed Zosterops. |

### Family Cuculidæ.

| | |
|---|---|
| *Cuculus inornatus* | Plain Cuckoo. |
| *Cuculus cineraceus* | Grey Cuckoo. |
| *Chrysococcyx lucidus* | Bronze Cuckoo. |

### Family Psittacidæ.

| | |
|---|---|
| *Cacatua galerita* | Common Cockatoo. |
| *Calyptorhynchus xanthonotus* | Black Cockatoo. |
| *Callocephalon galeatum* | Gang Gang Cockatoo. |
| *Platycercus flaviventris* | Green Parrott. |
| *Platycercus eximius* | Rose Hill Parrakeet or Rosella |
| *Euphema chrysostoma* | Blue-banded Grass-Parrakeet. |
| *Euphema aurantia* | Orange bellied Grass-Parrakeet |
| *Pezoporus formosus* | Swamp Parrakeet. |
| *Lathamus discolor* | Swift Parrakeet. |
| *Trichoglossus swainsonii* | Blue Mountain Parrakeet. |
| *Trichoglossus concinnus* | Musk Parrakeet. |
| *Trichogolossus pussilus* | Small Parrakeet. |

---

## ORDER—RASORES.

### Family Columbidæ.

| | |
|---|---|
| *Phaps chalcoptera* | Common Bronze-wing. |
| *Phaps elegans* | Brush Bronze-wing. |

### Family Turnicidæ.

| | |
|---|---|
| *Turnix varius* | Painted Quail. |

### Family Perdicidæ.

| | |
|---|---|
| *Coturnix pectoralis* | Pectoral Quail, Stubble Quail. |
| *Synoicus australis* | Brown Quail. |
| *Synoicus diemenensis* | Tasmanian Partridge. |

## ORDER—GRALLATORES.

### FAMILY STRUTHIONIDÆ.

| | |
|---|---|
| *Dromaius novæ hollandiæ* | Emu, extinct; no specimens having been observed for thirty years. |

### FAMILY CHARADRIADÆ.

| | |
|---|---|
| *Hæmatopus longirostris* | White-breasted Oyster-catcher |
| *Hæmatopus fuliginosus* | Black Oyster-catcher. |
| *Sarciaphorus pectoralis* | Black-breasted Plover. |
| *Squatarola helvetica* | Grey Plover, or Sand Piper. |
| *Charadrius orientalis* | Golden Plover. |
| *Hiaticula monacha* | Hooded Dottrel. |
| *Hiaticula ruficapilla* | Red-capped Dottrel. |
| *Hiaticula inornata* | Allied Dottrel. |
| *Hiaticula bicincta* | Double-banded Dottrel. |

### FAMILY RECURVIROSTRIDÆ.

| | |
|---|---|
| *Recurvirostra rubricollis* | Red-necked Avocet. |
| *Limosa uropygialis* | Barred-rumped Godwit. |

### FAMILY TRINGIDÆ.

| | |
|---|---|
| *Schæniclus australis* | Marsh Tringa. |
| *Schæniclus subtorquatus* | Curlew Sandpiper. |
| *Schæniclus albescens* | Little Sandpiper. |
| *Strepselas interpres* | Turnstone. |

### FAMILY SCOLOPACIDÆ.

| | |
|---|---|
| *Gallinago australis* | New Holland Snipe. |

### FAMILY TANTALIDÆ.

| | |
|---|---|
| *Numenius australis* | Australian Curlew. |

### FAMILY ARDEIDÆ.

| | |
|---|---|
| *Ardea novæ-hollandiæ* | Blue crane. |
| *Botaurus australis* | Australian Bittern. |

### FAMILY RALLIDÆ.

| | |
|---|---|
| *Porphyrio melanotus* | Red bill. |
| *Tribonyx mortierii* | Native Hen. |
| *Rallus lewinii* | Lewin's Rail. |
| *Rallus pectoralis* | |
| *Porzana fluminea* | Spotted Water Crake. |
| *Porzana palustris* | Little Water Crake. |
| *Porzana immaculata* | Little Swamp Hen |

## ORDER—NATATORES.

### FAMILY ANATIDÆ.

| | |
|---|---|
| *Cygnus atratus* | Black Swan. |
| *Cereopsis novæ-hollandiæ* | Cape Barren Goose. |
| *Casarca tadornoides* | Mountain Duck. |
| *Anas superciliosa* | Black Duck. |
| *Anas punctata* | Teal. |
| *Spatula rhynchotis* | Shoveller. |
| *Malarcorhynchus membranaceus* | Pink-eyed Duck. |
| *Nyroca australis* | White-winged Duck. |
| *Biziura lobata* | Musk Duck. |

### FAMILY LARIDÆ.

| | |
|---|---|
| *Larus pacificus* | Pacific Gull. |
| *Xema jamesonii* | Jameson's Gull. |
| *Lestris cattarractes* | Skua Gull. |
| *Sylochelidon strenuus* | Caspian Tern. |
| *Thalasseus poliocercus* | Bass's Straits Tern. |
| *Sterna gracilis* | Graceful Tern. |
| *Sternula nereis* | Little Tern. |

### FAMILY PROCELLARIDÆ.

| | |
|---|---|
| *Diomedea exulans* | Wandering Albatros. |
| *Diomedea cauta* | Shy Albatros. |
| *Diomedea culminata* | Culminated Albatros. |
| *Diomedea chlororhynchos* | Yellow-nosed Albatros. |
| *Diomedea melanophrys* | Black-eyebrowed Albatros. |
| *Diomedea fuliginosa* | Sooty Albatros. |
| *Procellaria gigantea* | Giant Petrel. |
| *Procellaria conspicillata* | Spectacled Petrel. |
| *Procellaria hasitata* | Great Grey Petrel. |
| *Procellaria macroptera* | Great Winged Petrel. |
| *Procellaria atlantica* | Atlantic Petrel. |
| *Procellaria solanderii* | Solander's Petrel. |
| *Procellaria leucocephala* | White-headed Petrel. |
| *Procellaria mollis* | Soft-plumaged Petrel. |
| *Procellaria leucoptera* | White-winged Petrel. |
| *Procellaria cookii* | Cook's Petrel. |
| *Procellaria cœrulea* | Blue Petrel. |
| *Procellaria glacialoïdes* | Silvery-grey Petrel. |
| *Puffinus brevicaudatus* | Short-tailed Petrel. |
| *Daption capensis* | Cape Pigeon. |

| | |
|---|---|
| *Prion turtur* | Whale Bird. |
| *Prion ariel* | Fairy Whale Bird. |
| *Prion banksii* | Bank's Whale Bird. |
| *Prion vittatus* | Broad-billed Whale Bird. |
| *Thalassidroma nereis* | Grey-backed Storm Petrel. |
| *Thalassidroma wilsonii* | Wilson's Storm Petrel. |
| *Thalassidroma melanogaster* | Black-bellied Storm Petrel. |
| *Thalassidroma leucogaster* | White-bellied Storm Petrel. |
| *Puffinuria urinatrix* | Diving Petrel. |

### FAMILY PELILICANIDÆ.

| | |
|---|---|
| *Pelecanus conspicillatus* | Australian Pelican. |
| *Phalacrocorax novæ-hollandiæ* | Australian Cormorant. |
| *Phalacrocorax leucogaster* | White-breasted Cormorant. |
| *Phalacrocorax melanoleucus* | Little Cormorant. |
| *Sula australis* | Australian Gannet. |

### FAMILY PODICIPIDÆ.

| | |
|---|---|
| *Podiceps australis* | Diver. |
| *Podiceps poliocephalus* | Grey-headed Diver. |
| *Podiceps gularis* | Black-throated Diver. |

### FAMILY SPHENISCIDÆ.

| | |
|---|---|
| *Eudyptes chrysocome* | Crested Penguin. |
| *Spheniscus minor* | Little Penguin. |
| *Spheniscus undina* | Fairy Penguin. |

Of the above list, forty-three are roaming sea birds, only twenty-six kinds are peculiar to the island, and six of these are very doubtful species, so that we cannot put down more than twenty birds, so limited in their habitat.

The most interesting of them are the large Gill-bird *Anthochæra inauris;* the Tasmanian Parrakeet, *Platycercus flaviventris;* the large Quail, *Synoicus dimenensis;* and the great Water-hen, *Tribonyx mortierii.*

The reptiles, as might be expected from a cold climate, are few in number. I do not think that Tasmania furnishes more than two or three species to the Australian fauna. The well known *Hinulia whiteii*, the peculiar *Omolepida casuarinæ*, a *Grammatophora*, two small species of *Hinuliæ*, and a *Cyclodus* (*Cyclodus nigroluteus*), allied to our "Sleeping Lizard," are all the saurians known to exist there.

No tortoise inhabits the Tasmanian streams. Snakes abound, but the number of species is limited to two highly venomous kinds, and a small one, venomous but not dangerous. Not a single innocuous snake has as yet been discovered.

All the snakes belong to the peculiar Australian genus *Hoplocephalus*, and are local varieties of continental forms. They go under different names in Tasmania however, such as "Black Snake," "Carpet Snake," and "Diamond Snake."

The first two are varieties of our "Brown-banded Snake," *Hoplocephalus curtus*, and named "Black Snake" if of a dark color; and "Carpet Snake," if light, with the cross-bands visible. The Museum is indebted to Mr. Masters for a fine series of both, and having taken thirty-five young (some black, and some with visible cross-bands) from the same mother, the identity of both is sufficiently proved.

The term "Carpet Snake" is not well chosen, and leads to frequent mistakes here and in Tasmania, as our own "Carpet Snake" *(Morelia variegata)*, belongs to the Python tribe and is not venemous.

The second dangerous snake is *Hoplocephalus superbus*, the "Tiger Snake" of Victoria, known to Tasmanians as the "Diamond Snake," another popular name which leads to confusion if we bear in mind that the "Diamond Snake" *(Morelia spilotes)* of the south-eastern coast of New South Wales is a member of the Python family and harmless.

The third venemous snake is the *Hoplocephalus coronoides*, or "Black-bellied Snake," of small size and wide range. This snake, even when handled, seldom, if ever, offers to bite, and the wound caused by it is not as bad as the sting of a bee.

Two other small snakes *(Brachysoma bimaculatum* and *B. calonotos*), discovered by Mons. Verreaux in 1844, are mentioned by Messrs. Dumeél and Bibron, as inhabitants of Tasmania; since then no more specimens have come to hand from the same locality, and we may fairly conclude that the habitat given by M. Verreaux is erroneous.

The Tasmanian frogs are also few in number. The *Hylæ*, or "Tree Frogs," represent three species, viz., the common "Golden Tree Frog," *Hyla aurea;* "Ewing's Tree Frog," *Hyla ewingii;* and a kind, which I consider to be identical with *Hyla verreauxii*, all of which are common on the mainland of Australia. Of Swamp-frogs, we find the widely distributed *Limnodynastes tasmeniensis*, a *Pseudophryne* discovered by Mr. Masters, and probably new, *Pterophrynus tasmaniensis* and *P. lævis*, the two latter much infected by the larvæ of a small fly of the Genus *Batrachyomya* (Macleay), which insects are also found on allied species in Australia.

These are all the species of frogs known from Tasmania, up to the present time.

The fishes, such as inhabit fresh water only, are also limited. No *Eleotris*, known here as the "Gudgeon," is as yet recorded, though the genus exists in Australia, New Zealand, and South America; of the *Galaxidæ*, the so-called "Black-fish," appears to be most common in the Tasmanian streams; this is Richardson's *Galaxias truttaceus;* we also have specimens of the *Galaxias attenuatus*, from the Ouse River, collected by Mr. Masters; the "Common Eel," *Anguilla australis*, and the well known "Fresh-water Herring," *Prototroctes marœna.* I wish I could have added the Salmon, but at present no authenticated specimens exist in any of our colonial museums. Competent judges state that the Salmon has been duly acclimatized, and has been frequently observed in the Derwent, it is therefore much to be regretted, that no specimen has yet been caught, if only to prove beyond doubt the success of one of the greatest experiments of modern times.

In summing up the whole Vertebrata of the island, leaving out the extinct Dingo, Seals, Whales, and Marine fish, we find there are

| | | |
|---|---|---|
| | 27 | Mammals |
| | 162 | Birds |
| | 6 | Lizards |
| | 3 | Snakes |
| | 7 | Frogs, and |
| | 4 | Fresh-water Fishes. |
| Together | 209 | Vertebrata |

about thirty-seven of which may be considered peculiar to Tasmania.

The Invertebrata were collected to the number of more than one thousand species, that is to say, of the class Insecta, nine hundred and fifty species, and ninety-eight of the class Mollusca; twenty-one of the latter are Land-shells, and nearly all peculiar to Tasmania. The insects appear, with few exceptions, to be identical with Australian species.

The following is a list of the Invertebrata:—

## CLASS INSECTA.

### ORDER—COLEOPTERA.

640 species, and 7662 specimens.

### ORDER—DIURNAL LEPIDOPTERA.

**Papilio macleayanus.**
**Pyrameis itea.**
**Pyrameis cardui.**
**Junonia vellida.**
**Lasiommata merope.**
**Lasiommata philerope.**
**Lasiommata singa.**
**Lasiommata lathoniella.**
**Lasiommata hobartia.**
**Satyrus (one very rare species).**
**Lycæna (four species).**
**Pamphila (two species.)**
**Together sixteen species of Lepidoptera.**

### ORDER—HYMENOPTERA.

90 species and 478 specimens.

### ORDER—DIPTERA.

86 species and 689 specimens.

### ORDER—NEUROPTERA, ORTHOPTERA, &C.

14 species.

### ORDER—HEMIPTERA.

70 species and 394 specimens.

### ORDER—HOMOPTERA.

34 species and 137 specimens.

---

## CLASS MOLLUSCA.

98 species and 960 specimens, whereof the following are Land shells, and, except *Helix morti*, are all peculiar to Tasmania.

**Helix minima** *(Cox)*
**Helix subangulata** *(Pfr.)*
**Helix bombycina** *(Pfr.)*
**Helix diemenensis** *(Cox)*
**Helix morti** *(Cox)*
**Helix tasmaniæ** *(Cox)*
**Helix hobarti** *(Cox)*
**Helix legrandi** *(Cox)*

Helix similis *(Cox)*
Helix lampra *(Pfr.)*
Helix lamproides *(Cox)*
Helix wellingtonensis *(Cox)*
Helix launcestonensis *(Reeve)*
Helix bisulcata *(Pfr.)*
Helix sinclairi *(Pfr.)*
Helix hamiltoni *(Cox)*
Bulimus dufresnii *(Leach)*
Bulimus tasmanicus *(Pfr.)*
Vitrina milligani *(Pfr.)*
Vitrina verreauxi *(Pfr.)*
Succinea australis *(Fer.)*

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APR 6 1901

# MONTHLY NOTICES

4987

OF

# PAPERS & PROCEEDINGS

OF THE

# ROYAL SOCIETY

OF

# TASMANIA,

FOR

1869.

TASMANIA:
PRINTED AT THE "MERCURY" STEAM PRESS OFFICE, HOBART TOWN.
1870.

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## ERRATA.

Page 6.—Sixth line from bottom, for “pieced,” read “placed.”

Page 12.—First line, for “heptica,” read “hepatica.”

Page 59.—Twelfth line, for “Eudochrome,” read “Endochrome.”

# ROYAL SOCIETY.

## MARCH, 1869.

The monthly evening meeting of the Fellows, the first of the present session, was held on Tuesday, the 9th March, J. Barnard, Esq., in the chair.

The Hon. Secretary (Dr. Agnew) laid on the table the following returns:—

1. Visitors to Museum (February), 887.
2. Ditto to Gardens (February), 1,911.
3. Plants, &c., received at Gardens (February):—From the Acclimatisation Society, Christchurch, New Zealand, seeds of Areca sapida, and Cordyline indivisa.
   From Mr. C. F. Creswell, 11 packets seeds and 9 species of bulbous plants received from England.
4. Seeds sent from Gardens:—
   To A. Verschaffelt, Ghent, Belgium, one packet of seeds of Areca sapida.
5. Time of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
6. Books and periodicals received during January and February.

*Meteorological Returns:—*

1. Hobart Town, from F. Abbott, Esq., tables for January and February.
2. Port Arthur, from J. Boyd, Esq., table for January.
3. Swansea, from Dr. Story, ditto, ditto
4. Westbury, from F. Belstead, Esq., ditto, ditto and February.
5. Adelaide, South Australia, from C. Todd, Esq., Government Observer, tables for December, 1868.
6. Sydney, New South Wales, from C. R. Todd, Esq., Government Observer, tables for December and January.

The presentations were as follows:—

1. From J. Milligan, Esq., London.
   *(a)*. Seven packages of Tasmanian plants, named by Dr. Hooker, of Kew.
   *(b)*. Two ditto Italian plants.
   *(c)*. Six specimens of *Calymene Blumenbachii* from Wenlock Shale, Gotland
   *(d)*. Specimen of Esparto Grass.
2. From G. Whitcomb, Esq.:—
   *(a)*. Sample of coal from Lambton Colliery, Newcastle, and Bituminous Shale from Hartley, New South Wales.
   *(b)*. Sample of Sugar Cane-grown in Queensland.
3. From G. Krefft, Esq., Sydney Museum, per M. Allport, Esq., five prepared skins of birds from King George's Sound.
4. From Mr. R. T. Dyer, Brighton, an Albino variety of the Rosella Parrot *(Platycercus eximius)*.
5. From the Hon. R. Officer, a White Hawk.
6. A Goshawk *(Astur approximans)*.

7. From S. Hannaford, Esq., specimen of *Sipunculus* from Corio Bay, Geelong.
8. From Captain T. Nichols, Skeleton of a Fish from Howe's Island.
9. From Mr. J. Kelly, One Shilling of Queen Anne, 1707, and a Danish Copper Coin, 1771.
10. From Mr. S. H. Wintle:—
    - *(a)*. A Vegetable Impression in Shale, from a height of between three and four thousand feet on Mount Wellington *(Endogenophyllites Wellingtonensis.* McCoy.)
    - *(b)*. A Cluster of Plant Impressions from a Claystone Formation in Patrick-street.

[In reference to this specimen, Mr. Wintle mentioned in his note that he had for a number of years past been in the habit of examining the formation from which it was obtained, whenever he happened to be in the locality, but had not succeeded in finding any trace of organic structure until about three weeks ago, when he discovered several impressions similar to those presented. He also stated that he had sent some to Professor McCoy, who considers them of great importance, and will shortly determine the position they hold in the scale of fossil flora.]

- *(c)*. Fragments of Shale, bearing impressions of Cryptogamic Plants from New Town.
- *(d)*. Specimen of Pholas sp. from Rocks below Sandy Fay.
- *(e)*. Collection of specimens of Coleoptra, &c.
- *(f)*. Gall Fly and Nest, also a smaller species, with its Larva.

The Hon. Secretary read notes by Mr. Wintle, on the fossils and other objects presented by him. The recent Pholas, with its perfect syphon, preserved in spirits, and the shell of another embedded in the clay rock, into which the animal had bored to a considerable depth, were examined with interest, as also were the large and small Gall Flies, which produce their characteristic growths on the leaves of the gum and other trees. As to one of the fossils (No. 10, *a*) a letter was read from Professor McCoy, to whom it had been sent by Mr. Wintle for examination, and by whom, as a new species, it had been named *Endogenophyllites Wellingtonensis.*

Mr. M. Allport called attention to the many interesting specimens presented by Mr. Wintle; and mentioned in reference to the vegetable remains occurring in the clay rock, that similar impressions had been many years ago found by him (Mr. Allport) in vast numbers, in a quarry at the Old Beach, but from the coarser material, the difficulty of assigning to them their correct position amongst fossil flora was very great. Recently, Mr. Allport had found similar remains in a quarry near the Cascades, and that gentleman remarked that if a few more would interest themselves in a strict search, the probability was strong that remains of greater palæontological interest, and which would fix the geological age of the whole of these rocks, might be found. Referring to the wasp's nest presented by Mr. Wintle, Mr. Allport presented a similar nest with the wasp which constructed it, the wasp having been watched at work on the nest, caught and brought to the donor by a boy only five years old.

Mr. Barnard, in continuation of a former paper on the subject, read the following communication relative to the Esparto Grass, and laid on the table a sheet of Esparto paper:—"It may be in the recollection of the Fellows that, at the meeting of the Royal Society which was held on the evening of the 14th July last, on the occasion of submitting some observations on the desirability of acclimatizing the Esparto Grass for the manufacture of paper, with a view to the establishment of a paper mill in Tasmania, I was requested to prosecute the enquiry, and obtain further information on a subject considered of wide importance. Accordingly, by the July mail I gave effect to my promise of compliance with that request, by placing myself in communication with an eminent commercial firm in London, and soliciting their co-operation in the matter; and I will now lay before the Society the result of the correspondence up to the present date, regretting, while sanguine of the attainment of ultimate success, that more should not have by this time been accomplished. By return mail, under date 11th September, 1868, these gentlemen write:—'The short interval between the arrival and departure of the Marseilles Mail, has prevented our obtaining any useful information with regard to the Esparto Grass for the manufacture of paper; but you may rely upon our doing our best to assist you; and we will report, by next mail, the result of our inquiries.' Agreeably to this intimation, on the 9th October I was favoured with the following particulars:—'Esparto Grass.—We learn that 50,000 to 100,000 tons are imported here annually from Spain and the opposite coast of Africa. The last that was sold here fetched £4 15s. a ton, but scarcely any comes in here for sale. The bulk is bought by a company (in which Lloyd is the principal man) who have establishments in Spain, and own or charter ships for bringing in whole cargoes, and have a patent for dressing it here. It seems quite a monopoly, and other importers have discontinued. Under the circumstances, as you will conjecture, it is not easy to obtain information; but we have been able to get a sample of the last sold here, which we send you by this Mail. We are endeavouring to procure through some friends in Spain, a bushel of the seed. If we succeed, we will forward it to you; but it will be some time first.' By the last Mail, under date 31st December, 1868, the same gentlemen write:—'We have not succeeded in getting any further information about the Esparto grass; but we understand that another vegetable fibre—from Africa—is being tested by paper-makers, and promises good results. We will communicate any further information which we may obtain on the subject.' The sample of Esparto grass referred to has been laid upon the table, and the Society will please to receive the information embodied in the foregoing correspondence in the light of a progress report, to be followed up by further information from time to time as it may be transmitted. I present a sheet of paper manufactured from Esparto grass, for which I am indebted to the courtesy of Messrs. William Knight and Co., merchants of the New Wharf, which will enable the members to judge of its quality."

Mr. Justin Browne had seen it stated that this grass was driving rags out of the English market.

Mr. Napier observed that the profit from the grass must be enormous, as its price was but £4 10s. per ton, whilst the value of the paper produced from it was from £40 to £50 per ton.

Mr. F. Abbott read an interesting paper on the late transit of Mercury over the Sun's disc.

The Secretary in laying before the meeting two specimens of the dried mutton fish *(Haliotis sp.)*, prepared by the Chinese at South Port, read the following note from Mr. Justin Browne:—"I send you for exhibition at to-night's meeting some dried Mutton Fish. The shell of this fish is well known as the 'ear shell,' and when living the fish envelopes the shell or nearly covers it, and clings to the rocks with great tenacity. The Chinese pierce the shell with a sort of spear, and the fish being thus paralysed is easily detached from the rock; it is separated from the shell much as an oyster is, and is then dried in a slow oven built for the purpose, after which the dried fish are packed in casks or cases for export. Before cooking, it is soaked in water for a considerable time. Crayfish are treated in the same manner, and are cured in large quantities."

Mr. W. Knight, junr., exhibited a black powdery looking substance received from Mr Glover, who procured it on the West Coast. It occurs in considerable quantities along some of the freshwater creeks, and on some of the sea beaches and is carbonaceous in character—possibly the remains of firewood used by the Aborigines at their cooking places, where shell and other fish were consumed.

On the motion of Mr. Allport, seconded by Mr. Justin Browne, the thanks of the meeting were given to the authors of papers, and the donors of presentations, especially to Mr. Wintle, for his very interesting contribution.

## APRIL, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, the 13th April, T. Giblin, Esq., in the chair.

The following returns for the past month were laid on the table:—

1. Visitors to Museum, 877.
2. Ditto to Gardens, 2,724.
3. Plants, &c., sent from Gardens.
4. Time of leafing, flowering, and fruiting of a few standard plants in Gardens.
5. Books and Periodicals received.
6. Presentations to Museum.

*Meteorological Returns* :—

1. Hobart Town, from F. Abbott, Esq., Table and Summary for March.
2. Port Arthur, from J. Boyd, Esq., Tables for February and March.
3. Westbury, from F. Belstead, Esq., Table for March.
4. Brisbane, Queensland, from E. McDonnell, Esq., Meteorological Summary for February.
5. Lighthouses, &c., from the Hobart Town Marine Board, Monthly Tables for the half-year ended 31st December, 1868.

The presentations to the Museum and Library were as follows:—

1. From W. Johnstone, Esq., Trinity Hill, a Boomerang and Waddy from Queensland, a Spear from New Hebrides.
2. From H. M. Hull, Esq., a Key-hole Limpet, and Chiton, from Sandy Bay; a Magpie Perch.
3. From Mr. F. Holmes, portion of Skin of Whale, tanned.
4. From Mr. G. F. Gooch, a small Silver Coin.
5. From Mr. Mitchell, Sandy Bay, a Basket and Necklace made by Female Aborigines of Tasmania.
6. From Dr. Cox, Sydney, 67 specimens of Shells.
7. From Mr. Hannaford, an Ostracion and 2 seeds of the *Trappa bicornis*, from China.
8. From W. A. B. Gellibrand, Esq,, a Female Specimen of the Native Tiger *(Thylacinus cynocephalus)*.
9. From J. Maclanachan, Esq., a Hen Golden Pheasant.
10. From J. Swan, Esq., Skeletons of Forester and Brush Kangaroo, and 2 Bandicoots.
11. From Mrs. Room, Launceston, an Indian Silver Coin (½ rupee)
12. From Dr. W. Sonder, Hamburg, Flora Capensis, by Drs. Harvey and Sonder, 3 vols. bound cloth.
13. Tasmanian Industries, by J. E. Calder, Esq. (pamphlet), 2 copies, presented by Her Majesty's Government.
14. Statistics of New Zealand, 1867, presented by New Zealand Government.
15. From E. D. Harrop, Esq., Launceston, Four Mounted Specimens of Fluke *(Fasciola hepatica)*.
16. From Mrs. C. Meredith, Specimen of the Australian Coot (*Fulica Australis*).
17. From Mr. F. A. Moore, Mangalore Farm, Bridgewater, a Copy of *The Derwent Star and Van Diemen's Land Intelligencer*, April 3rd, 1810, containing an account of the death of Governor Collins. Printed Government Orders, January 14th, February 5th, March 2nd, April 5th, 6th, and 15th, 1814. A Promissory Note, value 3d., signed W. Robinson, 1824. [These records of the early days of the Colony excited much attention among the members present.]

The Secretary, Dr. Agnew, read a letter from Baron F. Von Mueller, intimating that a copy of a work entitled "Flora Capensis," by Drs. W. H. Harvey and O. W. Sonder, had been presented to the Society by the latter gentleman. (See presentation No. 12.) Dr. Sonder also took the opportunity of conveying his thanks for his election as a corresponding member of the Society.

Mr. M. Allport informed the meeting that he had this season successfully stripped and fecundated the ova from the indigenous grayling *(Prototroctes muræna)*. The male and female fish were taken with the rod at the Falls, New Norfolk, during the last week in March. The ova were brought to town and deposited in a slate tray with a gentle stream of water running through it. The embryos first showed in 3 days and hatched out in 8 to 12 days. Unfortunately the delicate little fish scarcely survived the extrusion from the egg more than a few minutes, and were all lost, probably from want of greater depth, or other physical condition of the water, of which we are at present ignorant. The main interest attaching to the experiment is, that it upsets the theory long held by many fishermen that these fish spawn in salt water.

The Secretary read a paper by Mr. E. D. Harrop, of the Bank of Van Diemen's Land, Launceston, on the fluke *(Fasciola hepatica)*. The subject was illustrated by several microscopical preparations (mounted by the author) of the Ova, Ovaries, &c., of the animal, which were examined with much interest by the Fellows present.

Discussion followed, and, after a well-merited compliment to Mr. Harrop, for the care and neatness displayed in the mounted specimens of fluke presented to the Society, Mr. M. Allport observed that Mr. Harrop regrets that he has been unable to prepare any specimens of the Cercariæ of Fasciola hepatica, thereby implying that he has found such Cercariæ; has he done so? and if so, where? Mr. Allport believed that reliable information as to the Cercariæ being found elsewhere than in sheep, would supply a link hitherto missing in the natural history of this fluke. Cobbold expressly states that the life of the liver fluke subsequent to the hatching of the ciliated embryo, and until its re-appearance in the liver of the sheep, is at present unknown, but, that analogy (based on the well-known history of other allied creatures) would lead to the conclusion that the embryo takes up its residence in a molluscan host, and forms sporocysts, the progeny from which ultimately get to the interior of the sheep. Mr. Allport admitted that the probabilities are strong that some other hosts than mammalia were concerned in the development of the liver fluke, but stating that to the best of his belief proof was yet wanting.

Mr. Walter Gellibrand mentioned an instance in which he had known sound ground on which a few fluky sheep were pieced for a few days, to transmit the disease to sound sheep in three weeks, in this case it seems hard to believe that any intermediate host was concerned in the development of the perfect fluke.

A vote of thanks to Mr. Harrop, and to the donors of presentations, closed the proceedings.

## MAY, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, the 11th May, M. Allport, Esq., in the chair.

The following returns for the past month were laid on the table:—

1. Visitors to Museum, 781.
2. Ditto to Gardens, 1,567.
3. Plants, &c., received at gardens.
4. Ditto, sent from gardens.
5. Time of leafing, flowering, and fruiting of a few standard plants in gardens.
6. Books and periodicals received.
7. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq., table and summary for April.
2. Swansea, from Dr. Story, table for April.
3. Westbury, from F. Belstead, Esq., table for April.
4. Sydney, from G. R. Smalley, Esq., Government Observer, table for February.
5. New Zealand, from the Government Observer, tables for January and February.

The presentations were as follow:—

1. From Mrs. C. Meredith, a Coot (*Fulica Australis*).
2. From Hon. C. Meredith, Esq., two specimens of "Silver Fish" from Prosser's Bay.
3. A Kingfisher (*Alcyone azurea*) donor unknown.
4. From T. Stephens, Esq., a Kingfisher (*Halcyon sanctus*), from Southport.
5. From E. D. Swan, Esq., nest and eggs of *Epthianura albifrons*, found at Cornelian Bay.
6. From Dr. Storey, Swansea, skeletons of Eagle Hawk, Crane, Bandicoot, &c.
7. From Mr. A. J. Taylor, New Norfolk, a copper Coin of French Republic.
8. From Mr. Rollings, Sorell, a Jade Chisel from New Zealand. Flint Implement used by Tasmanian Aborigines for skinning Kangaroo, &c.
9. From M. Allport, Esq., Gelatinous tube of Salpa, and small Crustacean found within it. From Adventure Bay.
10. Ditto, found at sea on the voyage from England, presented by Miss S. P. Edwards.
11. From the Hon. R. Officer, Esq., M.H.A., a set of Maps of Geological Survey of Victoria, 1 vol. bound.

Mr. Stephens called attention to a specimen of Kingfisher (presentation No. 4), which he had brought from Recherche Bay, where it was shot by Mr. Collis, and remarked that it was not included by Gould among the birds of Tasmania.

Mr. Swan remarked that he had for some time been aware of the existence of a second species of Kingfisher in Tasmania, and on examining the bird referred to by Mr. Stephens, had no doubt as to its being a specimen of the sacred Halcyon (*Halcyon sanctus*), whose habitat had hitherto been supposed to be confined to the Australian Continent.

With regard to presentation No. 5 (Nest and Eggs of *Epthianura albifrons*) the same gentleman observed that it was interesting, as proving beyond a doubt that these birds breed in the colony, they having previously been looked upon as mere casual visitors.

Referring to the crustaceans presented (Nos. 9 and 10), Mr. M. Allport stated that his specimen was picked up alive on the beach at Adventure Bay. At first the animal kept itself so pertinaciously within the clear gelatinous cylinder (resembling in shape a small barrel with the ends knocked out), through which it could be distinctly seen moving about, that he took this cylinder to be a part of the animal, probably some extension of the carapace, analagous to that found in the entomostraca, but further observation showed that the enclosed crustacean was quite free of its beautiful envelope, and that it readily protruded its head and anterior limbs from either aperture. The envelope might be the empty case of one of the Salpæ, a family of floating molluscs, many genera of which are common round our coast, and the crustacean either took up its temporary residence in the already empty case or, as is most probable, had first devoured the softer parts of the mollusc and was on the look out for a second victim. Having preserved the specimen, Mr. Allport showed it some time after to a lady (Miss Edwards), who immediately recognised it as identical with one caught by her in a floating dredge on the voyage from England several years before, and which she had preserved. In order to demonstrate that the crustacean in the first specimen had not chosen its crystal-like home by mere chance, but as a part of the regular economy of this curious animal, Miss Edwards had kindly presented her duplicate specimen to the Museum.

Mr. Allport incidentally remarked that many of the Salpæ from the diaphanous nature of their outer covering, would form beautiful living objects for low powers at one of the Society's microscopic meetings.

Mr. Stephens, in bringing under special notice the fossils from Table Cape, collected and presented to the Society by Mr. Hainsworth, gave a lucid sketch of the geological formation of the portion of the northern seaboard of the island, extending from the Tamar to Circular Head. He then noticed in detail several of the specimens, and pointed out their value in a palæontological point of view. Mr. Stephens also referred to the great value which a more complete series would be to the Museum, and was sanguine that Mr. Hainsworth would still pursue his labours in the cause, and enrich the collection with specimens yet to be discovered.

Mr. M. Allport called attention to a branch of Gum (*Eucalyptus sp.*), kindly forwarded by Lady Dry, the leaves of which were coated with a purple powder, resolving itself, under the microscope, into myriads of eggs of some insect, now rapidly hatching, and probably belonging to the Aphides. Under the low powers of the instrument the brilliant colours of the egg-cases elicited much admiration.

The Chairman (Mr. Allport) after the proposal of the vote of thanks to the donors of presentations, and to Mr. Stephens, for his able remarks on the geology of the North Coast, called the attention of the meeting to one fact, that fixed the geological age of the raised beaches at Table Cape at about the same as the Travertine of Geilston Bay, though one was of marine, and the other of fresh-water origin, viz., the presence in each of bones of existing animals, as evinced by the Wallaby skeleton obtained from the coast formation by Mr. Wm. Archer, and the bones of the Dasyuri, Phalangistæ, and Permales, obtained by himself from Geilston.

After some conversational discussion, the thanks of the meeting were accorded to the donors of presentations, specially to Mr. Hainsworth for his valuable contribution, and to Mr. Stephens for his interesting address.

The meeting then terminated.

# ON THE TRANSIT OF MERCURY OVER THE SUN'S DISC, NOV. 5TH, 1868.

By Francis Abbott, F.R.A.S., &c.

I lay on the table a diagram in which is embodied the elements, and a full explanation, of the transit of Mercury, with the true path of the planet over the sun's disc on the 5th of November, 1868. The observations were made with a five foot equatorially mounted achromatic telescope. Other observations were also made at the time, and near the same place, with a small Gregorian reflector. The day was fine, and the passage of the planet over the sun's disc was observed as a well-defined round black spot. When the true limb of the planet reached the true limb of the sun, the light being cut off, a fine dark ligament appeared to connect the limb of the planet and the sun, showing the true time at first contact.

The Hobart Town time of transit was computed from the Nautical Almanac; the observations made with a half second chronometer, and when compared with the normal clock it was found to be remarkably close, I scarcely think one second in error.

The sun's limb was well defined, and the tremor by no means considerable. Some measures were made of the difference of right ascension of the Sun and Planet, they have been corrected for refraction, and for the motion of the sun, and are compared with the elements given in the nautical almanac, as shown in the diagram. In the observation I saw neither central bright spot, halo, nor satellite. My attention was directed to time determinations for ascertaining longitude, rather than to any peculiarities that might be presented during the transit.

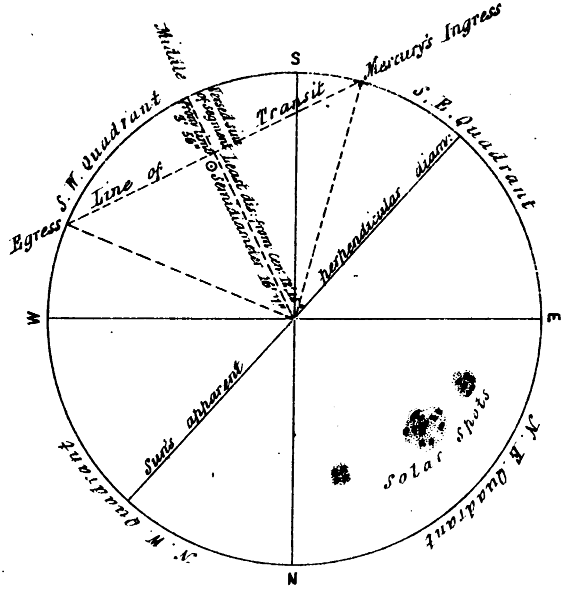
The Royal Astronomical Society are in full possession of all the means employed by Commander Kay for determining the geographical position of the Magnetic Observatory here, the whole series of observations consisted of moon culminating stars, of which 41 sets from both limbs of the moon were observed on the meridian, with an excellent transit instrument by Troughton and Simms. The solar eclipses, and the eclipses of Jupiter's satellites were observed with a telescope made for the purpose by Jones. When the distance of any two given places is not very great, the longitude is determined with accuracy by transmission of chronometers, for which purpose Captain Kay availed himself of the well known positions of the observatory at Parramatta and Fort Macquarie, Sydney Harbour; by this method no less than 76 chronometers were employed, independent of 110 astronomical observations, and a triangulation. The whole of these observations were made from the year 1843 to 1846, and in order to obtain the corresponding observations of the moon culminating stars, previous arrangements were made at Greenwich, Edinburgh, Cambridge and Oxford. The lunar observations were afterwards placed in the hands of Mr. Riddle, head Mathematical Master of the Nautical School at Greenwich, for reduction, and the whole series were reduced, and a paper drawn up from the results by Captain Shadwell, for the Astronomical Society, which gave for the longitude of Hobart Town, 9h. 49min. 29·6 secs.

Since the time this result was arrived at Captain Denham, when stationed at Garden Island, sent an officer into these waters for the purpose of confirming the longitude of Hobart Town. The mean result of all observations made at that time, gave for the longitude 9h. 49m. 28·8s. being a small difference of (0·8)—eight-tenths of a second. There remains, however, still much doubt as to the correct geographical position of any of the Australian colonies being correctly known. Captain Kay thinks with the Astronomer Royal, that for observing the forthcoming Transit of Venus, in December 1874 and 1882, they are not suited until better known. Mr. Ellery thinks differently, he considers the longitude of the Melbourne Observatory as well known as that at the Cape of Good Hope. The Sydney Astronomers believe the longitude established at Fort Macquarie, Sydney Harbour, and at the Observatory, Parramatta, by the late Sir Thomas Brisbane, assisted by his computer and observer, Mr. Rurnker, and Mr. Dunlop, to be the best known of any in these colonies. The authorities for the establishment of the longitude of Fort Macquarie, Sydney Harbour, and the chronometrical differences of meridians employed in the determination of the longitude for Hobart Town, from them, were very numerous.

The determination of the latitude of any place is a much simpler problem; the latitude obtained by Captain Kay, was the result of sextant observations by the method of circum-meridional altitudes of the sun and stars. In their reduction, Baily's Tables and Formulæ of reduction to the meridian, and Ivory's Tables of refraction, with their correction for pressure and temperature were used. Captain Kay thinks that the latitude assigned to the observatory cannot be much in error. If we consider the number of observations made and the large amount of labour bestowed upon them, the authority connected, and the result obtained, we have an equal right to consider the geographical position of Hobart Town, as correct as any of the Australian colonies. In all probability not one of the

To face p. 10

# TRANSIT OF MERCURY
## OVER THE SUN'S DISC
## NOVEMBER 5TH 1868



HOBART TOWN TIME OF INGRESS $\overset{h}{3}.\overset{m}{14}.\overset{s}{9}$ P.M.

" " " EGRESS 6 . 52 . 27 "

W. C. Piguenit, del.

F. Abbott

Survey Department, Hobart Town

ten principal observers engaged at the transit of Venus in 1769 had a fixed position more correct than that at Hobart Town.

The re-discussion of the transit of Venus in 1769 recently made by Mr. Stone, at the Greenwich observatory, from results of all observations made at the time, has reduced the sun's distance to near that arrived at by the opposition of Mars, and the speed of light, viz., 91,700,000 miles. This great problem therefore may be considered almost settled within the requirements of our present astronomy, and only waits for confirmation at the next transit of Venus to make all things accordant. This necessity is more felt owing to some doubt having arisen on a misinterpretation said to be made by Mr. Stone, in his re-discussion on Chappe's statement made at the time of contact of the sun and Planet, and the circumstance of Pauly having left his telescope before the last contact.

This question of the correct geographical position of these colonies therefore, is a problem that will require to be settled before the time arrives for ascertaining the true value of the solar paralax.

There is a great uncertainty of any expedition being able to reach either Wilks Land or Sabrina Land in the month of December. In all probability the Australian colonies will be made the southern limit of observation. If, therefore, some well-defined spot is fixed upon in the interim, and suitable means employed to establish it as a starting point for determining the correct geographical position of any other spot with equal accuracy, either by telegraphic communication or transmission of chronometers, several different stations could be either confirmed or corrected for the reception of any number of expeditions that might be sent to these colonies.

## REMARKS ON THE FLUKE *(FASCIOLA HEPTICA)*.

### BY E. D. HARROP, F.R.M.S.

Having lately had an opportunity of examining and dissecting specimens of Fluke, and in consequence having had to refer to some of the literature extant relating thereto, I venture to lay before your learned Society a few remarks, bearing more particularly on the generative organs, and reproduction of this parasite.

I beg to offer for examination by the Members, preparations as follows:—

Slide No. 1. *Fasciola hepatica*, taken from liver of sheep killed in the Midland District, showing oral and ventral suckers.

Slide No. 2. Portion of uterus, with eggs packed in situ.

Slide No. 3. Eggs of *Fasciola hepatica.*

Slide No. 4. Same; with operculum off, and vitelline contents extruded, also showing filamentoid spermatozoa.

These parasites are perfectly hermaphrodite. Their generative organs are well understood, and in proportion to the size of the animal, the extent and complication of these organs are astonishing. The male apparatus, the uterine cavity and oviduct, the yelk forming glands, occupy by far the greatest portion of the body.

Siebold says, "the female apparatus of the trematodes consists of a germ forming organ (ovary), with its excretory duct; then two others for forming the vitellus, which have also excretory ducts, and then a simple uterus with its vagina. The male apparatus consists of testicles with their excretory canals, an internal seminal vesicle, a cirrhus-sac, an external seminal vesicle, and a penis."

This simple and concise description fails to convey a sufficiently enlarged idea of the beautiful arrangement and extent of the organ devoted to reproduction in the species under consideration. The whole circumference of the body just beneath the skin is occupied by the ovaries, from these oviferous canals arise, and uniting on each side of the body, convey their contents into the large oviducts which terminate in the uterus. The male apparatus takes up the centre of the body. The testes, consisting of a great number of small and much convoluted vessels, terminate in two large tubes which convey the spermatic fluid to the vas deferens, which becoming attenuated, terminates at the root of the penis.

The uterus consists of a tortuous tube filled with eggs. A portion of the uterus is shown in preparation No. 2. The eggs are of a yellowish color, have an operculum, and are found in vast numbers in individual specimens of the entozoon. Slides Nos. 2 and 3 exhibit the eggs as taken from the uterine tube, and on slide No. 3, near some of the eggs, are to be seen some spermatic filaments.

Alternate generation is the term applied to the various transformations these entozoa undergo in the course of their full development. There is a missing link in some of the stages, but sufficient is known for a thorough comprehension of the subject. The eggs being formed by the elaborate and beautiful reproductive system above described, escape from the uterus one at a time, and when perfectly mature the operculum is pushed off by the energetic action of the ciliated embryos within. An examination of slide No. 3, will show embryos (unfortunately not sufficiently advanced to exhibit cilia) amongst the extruded vitellus. In some cases these embryos make their escape whilst the egg is within the uterus, but more frequently they escape whilst the egg lies on the marshy or moist pastures. According to Siebold the development of the egg is as follows :—" After the disappearance of the germinative vesicle, large transparent embryonic cells appear in the midst of the vitellus, which undergo fissuration. These multiply by division, increasing at the expense of the vitellus, which in the end they completely replace. When this has taken place there is a mass of extremely small cells, which being covered with a delicate epithelium having cilia, form a round or oval embryo." The ciliated embryo can progress in moist grass or water, and, sooner or later, attaches itself to the surface of the body of some mollusk, most commonly the limneus, planorbis, or paludina, when it loses its ciliated epithelium and gains access to the interior of its host. When there the germ bud contained in the embryo developes rapidly into a non-ciliated larva, within which another family is developed. The enlarged larva is now transformed into a cyst, and is then called a " nurse," and its contained family develope into cercariæ. These cercariæ have an independent life of their own, and it is not absolutely necessary to their existence that they should enter the viscera and liver of a vertebrate, but when there, they meet their highest form of development in the mature liver entozoon. I regret much that I have not been able to prepare specimens of the cercariæ, but when I do so I will forward some for inspection.

Let us recapitulate these powers of reproduction, commencing with the full-grown fluke :—In each individual a vast number of eggs are matured, and each one of these eggs contains a ciliated embryo, capable, after entering a molluscan host, of developing into a non-ciliated larva; this larva undergoes further development, has a considerable progeny of its own, which escape and are known as cercariæ; here follows under certain conditions, a separate existence not fully traced out, but each cercariæ can enter the viscera of a vertebrate, when, in the liver, it attains its final development in the full grown and sexually mature fluke. Let preparation No. 2 (in which only a portion of the uterus is shown) be examined under the microscope, and the number, and dense packing of the eggs be observed, we shall then be astounded at the capabilities of increase made manifest, and no longer wonder at the rapid spread of this parasite.

From this knowledge of the reproduction of the fluke, we may fairly deduce the following conclusions:—

First. That the immediate progeny of the Fasciola is innocuous to vertebrates, for certain metamorphoses or alternations of generation must be passed through before it can develope into the mature animal.

Second. That the eggs (being provided with a hard shell) having passed out of the Fasciola, may be blown about the country and not develope until they meet with favorable conditions.

Third. That an estate may have the reputation of being perfectly free from fluke and yet the germs may be there in myriads, ready to develope when favourable conditions arise, may be through an overmoist season, may be through increase in molluscan life, may be through subtle influences not yet explored.

Fourth. That on a comparatively dry estate, having the marshes well drained, the disease will never be very serious, unless the seasons happen to be peculiarly mild and moist.

Fifth. That molluscan, or aquatic insect life is necessary to the development of the ciliated embryo, but it is not known how long this embryo can live without moisture; yet it has been proved that infusorial life generally will bear extreme dessication and yet survive.

Sixth. That the offspring of flukey sheep are not born diseased; but in consequence of the systems of the parents being disordered, the offspring may be more predisposed to attacks of the worm, than those born of healthy sheep.

It is stated in a report on fluke, which recently appeared in the newspapers, that "when once a sheep becomes the host of flukes it is doomed, as the parasite will continue in the liver ducts until the life of the animal be exhausted." This does not appear to be the fact, for I have it not only on the authority of Cobbold, that the entozoon after entering the liver ducts, passes into the biliary outlet, thence into the intestinal canal, and is so expelled; but also from the observation of practical flock owners, that when sheep not 'badly flukey' are brought into dry healthy pastures they get round again. And it is also known, that the eggs are not, in most cases, expelled from the uterus until the fluke has passed from its host. Now this knowledge, removes, in some measure, the gloom from the terrible picture of the disease and its results portrayed in the report. The conclusion is almost beyond controversy, namely, given healthy, well-drained pastures and the fluke will disappear in a great degree; although the germs of the disease will always be there ready to spread in any flocks that may be exposed to attack by being placed in conditions favorable to their development.

Good drainage and occasional salt diet appear to be the only remedies known at present; but it is quite possible that certain breeds or crosses may, from having more vigorous systems and better digestive powers, withstand the entrance of the parasite into the tissues better than others.

Perhaps, I may be pardoned if, before concluding, I pass from the scientific side of the subject to the consideration rapidly and curtly, of its politico-economic relations.

The disease and its causes has been well known for the last century. Its internal microscopic structure has certainly, only comparatively recently been elucidated, but all that which relates to its dire effects on sheep, that which tends to irritate or to subdue its prevalence, has been intimate knowledge for a long time. Turning to the first edition of Cuvier, published in 1817, I find, under Les Trematodes, the following:—

"La plus celebre est la douve due foie (*Fasciola hepatica*, Linn), qui est si commune dane les vaisseaux hépatiques des moutons, mais qui se trouve aussi dans ceux de beaucoup d'autres ruminans, du cochon, du cheval, et même de l'homme.

"La douve des moutons se multiplie beaucoup, quand ils paissent dans des terrains humides, et leur occasionne l'hydropisie et la mort."

It is very evident, then, that the disease and causes of its aggravation have been known amongst sheep farmers for a long time. A sheep farmer, understanding his business, must have known well enough that, in taking up his flocks to the marshy lands of the Lake district he was taking them to certain disease; and without the slightest precaution, bringing them down to winter in the warmer country below, was taking as certain means to spread that disease. It may be presumed that some sheep farmers desirous of larger gains, have carried more sheep than their cultivated estates would bear in summer, and that during those months they sent them to depasture on lands utterly unprepared by drainage for their reception. The result was inevitable; for a time greater profits accrued, but a swift and dire Nemesis overtook those who offended against experience and reason, unfortunately, in many cases, causing the innocent alike to suffer with the culpable. I should not have thought of making these remarks if it were not that it has been proposed to render Government assistance in draining and firing the lands of flockmasters. I venture the opinion, in all deference, that it would be highly improper to render any such aid. The spread of the disease, for the germs are everywhere, has been caused through the cupidity or ignorance of flockmasters. Is it right that the public should pay because they are now suffering the consequences? It is no new thing, no sudden and hitherto unknown visitation, but, on the contrary, we know well its cause, and, therefore, the means of its alleviation. As soon would we think to live unsheltered in the fen country and escape ague, as to keep sheep on marshy grounds and expect them to escape the fluke.

It would be more in accordance with the dictates of political economy to let matters take their course until flockowners found it to be to their interest to study the sheep, its food, and requirements, with the same attention as they would any other animal from which profit is expected. There are times, perhaps, when for the general benefit, a government may resort to special measures, but in such case, whatever pecuniary outlay may be thought requisite should be met by a special tax on those who have caused the evil, either by their avarice, ignorance, or carelessness, and not on the public, who have obtained no benefits but rather absolute harm, the result of mismanaged property, which, although private, should not be used to the general disadvantage with impunity.

# REMARKS ON THE GEOLOGICAL STRUCTURE OF PART OF THE NORTH COAST OF TASMANIA, WITH SPECIAL REFERENCE TO THE TERTIARY MARINE BEDS NEAR TABLE CAPE.

By T. Stephens, M.A.

The interesting collection of rocks and fossils recently presented to the Museum by Mr. Hainsworth, of Table Cape, calls for something more than a passing notice, and the occasion suggests a brief consideration of the succession of strata exhibited by the coast section from the Tamar to Circular Head.

Between the Tamar and Port Sorell, the Primary rocks are extensively developed. They consist chiefly of slates, schists, limestones, quartzite, and conglomerates, with a general strike to the N.N.W., and they are to be seen continually recurring with anticlinal and synclinal undulations along the whole line of coast from Badger Head almost to Cape Grim. So little is known of the palæontology of these rocks, that it is impossible to do more than hazard a conjecture as to their relative position or age; but they comprise representatives of rocks which show themselves near the Grampians in Western Victoria forming possibly the base of the Lower Silurian series or even of still older date, and they certainly range in an upward direction as high as Upper Silurian. Slight traces of gold have been found at various points, but there is a singular absence of the dykes and veins of true quartz, and other features which characterise the auriferous slates of similar age in other countries. Still, the absence of all trustworthy indications of the presence of gold in paying quantities has not deterred the "practical digger" from wasting his money and time in prospecting such localities as the head of Middle Arm on the Tamar, and even more unpromising spots. Very rich red and brown hæmatites, with other ores of iron, are met with at various points, and notably on the west bank of the Tamar, where they have been fully investigated and reported on by Mr. Gould. Thin veins of galena associated with sulphurets of copper and iron, and carbonates of copper, occur near the Leven, and though the surface indications in that particular locality are not encouraging, they may some day be found further inland developed in valuable lodes.

Resting unconformably on these Primary rocks and usually occupying the ancient valleys formed by their elevation are sandstones and shales containing thin seams of excellent coal. They are associated with calcareous beds containing *Spirifera*

*Pachydomus* and *Producta* in great abundance, with many other well-known Upper Palæozoic fossils. The resiniferous shale or dysodile of the Mersey, has also been proved by Mr. Gould to belong to this series. These coal measures have not yet been recognised as existing West of the Leven, having probably been removed by denudation. They may, however, be met with as the settlement of the land advances southwards from the coast.

The horizontally bedded conglomerates and breccias of very variable character and uncertain age which occur at intervals between Port Sorell and Table Cape appear to come next in geological order, but may belong to the last named series of rocks. They have occasionally been tilted and broken by intrusions of basalt, and perhaps of trap also, but this is less certain. They are chiefly composed of rolled pebbles and angular fragments of the Primary rocks and the plutonic rocks associated with them, and are usually held together by a strong silicious cement. At the mouth of the Inglis this formation is especially interesting. Large angular blocks of granite and porphyry, the former sometimes weighing several tons, together with rolled pebbles of many of the Primary rocks, are here seen embedded in a fine grained mudstone; this being evidently derived from the denudation of some of the softer slates, and deposited as mud on the margin or in the bed of some ancient river or estuary, which occupied a basin with nearly the same principal boundaries as the modern Inglis. These massive blocks of granite and other rocks which are not now found *in situ* within several miles of their present position, I consider to furnish more conclusive evidence of glacial agency in the geological history of Tasmania than I have met with elsewhere, and they strongly corroborate the testimony afforded by the seemingly erratic boulders which occur at various points in the basin of the South Esk. The age of this conglomerate is doubtful. It underlies unconformably the Tertiary freestone, which has been determined by Professor M'Coy to be of Miocene age, and it contains boulders derived from rocks which are certainly not older than the Lower Carboniferous or Devonian period. In the mudstone which forms the matrix of the transported boulders no fossils have yet been discovered, and the chance of finding them is occasionally lessened by the jointing and rude cleavage which sometimes traverses even the hard pebbles of chert, quartzite, &c., contained in it, and almost entirely destroys the traces of original bedding. It is right to mention that some detached portions of conglomerate, apparently belonging to the formation which I am now describing, have some of the peculiar characteristics of the conglomerate which belongs to the Primary series; but they cannot be separated from the more recent formation without stronger evidence than can be obtained by the passing traveller.

Among the rolled pebbles which line portions of the beach near Table Cape, and have been derived from the disintegration of the conglomerates now under consideration, there have been found from time to time fragments of a hard compact shale, varying in colour from dark brown to dull black, and so closely resembling the so-called "kerosene shale" of Hartley in New South Wales, both in appearance,and behaviour under the simple tests to which I have subjected it, that they may be considered identical. Two specimens exhibiting the chief varieties, have been forwarded by Mr. Hainsworth, who rightly estimates the important results that would follow from the discovery of the original home of this shale, and has already devoted much of his leisure time to the exploration of the surrounding country in search of it, though hitherto without success. The entire absence of all the members of the Carboniferous series from which these waifs might have been derived is an adverse circumstance, and the occurrence of a single specimen would have attracted no attention. But the great difference between this shale and all the varieties of Tertiary lignite, which are common enough in Tasmania, and the discovery at different points of several specimens all identical in character, force us to the conclusion that it is of pre-Tertiary age, and that portions of the series from which it has come, though removed by denudation near the coast line, will one day be found at no great distance inland. The extraordinary toughness of the shale is worth noting. It is easily seen that it would long resist the destructive agencies which have played so important a part in the geological history of this and other countries, and might remain unaltered long after the accompanying sandstones had been ground down and borne away to fill the hollows of adjacent seas.*

I come now to the formation from which the interesting series of fossils now before us has been obtained. It varies in character from a breccia of coarse sand and broken shells to a fine-grained whitish sandstone, which has been used in

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* The subjoined report of an assay of this shale by Mr. Cosmo Newbery, of Victoria, has since been furnished by Mr. Hainsworth :—

KEROSENE MINERAL FROM NORTH COAST OF TASMANIA.

Burns freely with a yellow smoky flame, leaving a dark reddish brown ash. Contains iron pyrites. When heated in a closed vessel it melts, forming a fragile coke. A sample dried at 212° F. gives the following results :—

| | |
|---|---|
| Water driven off at 230° F. .. .. .. .. .. | 1.59 |
| Volatile matter .. .. .. .. .. .. .. | 67.36 |
| Fixed Carbon .. .. .. .. .. .. .. | 25.83 |
| Ash .. .. .. .. .. .. .. .. .. | 5.22 |
| | 100.00 |

the district for building purposes. It has been recognised at various points within a radius of five or six miles from the mouth of the river, and in some places shows a precipitous face of nearly 100 feet above high water mark. Although there is no section visible showing the actual contact between these beds and the basalt, which occupies a large extent of the adjacent country, there is no reason to doubt their priority to it; indeed, Mr. Hainsworth has informed me of an instance where basalt is found capping a small isolated hill which I know to have been formed by denudation, and which the basalt could only have reached by flowing in a lava-like sheet from a higher adjacent summit before the denudation had commenced. It is, however, quite possible that the fossiliferous strata represent two distinct periods, and that a portion of those which appear to abut against the basalt without the slightest alteration in character or position, may one day prove to be of more recent date.

The Museum already contains a series of these Tertiary fossils, presented by different donors, but it is surpassed both in extent and variety by the collection now before us. The specimens are for the most part tolerably perfect, but some of the more delicate shells were so injured by pressure upon the decomposing matrix in which they were embedded that they could not be cleaned for purposes of identification, and had to be preserved in their rough state. The collection contains upwards of sixty species of Mollusca, representing the following genera :—*Strombus*, *Typhis*, *Fasciolaria*, *Cancellaria*, *Cassis*, *Fusus*, *Ancillaria*, *Conus*, *Pleurotomaria*, *Voluta*, *Mitra*, *Cypræa*, *Trivia*, *Natica*, *Potamides*, *Turritella*, *Siliquaria*, *Littorina*, *Trochus*, *Dentalium*, *Terebratula*, *Waldheimia*, *Rhynchonella (?)*, *Ostrea*, *Pecten*, *Lima*, *Spondylus*, *Modiola*, *Arca*, *Limopsis*, *Cucullæa*, *Pectunculus*, *Trigonia*, *Chama*, *Cardium*, *Lucina*, *Cyprina*, *Cardita*, *Venus*, *Venerupis*, *Crassatella*, *Tellina*, *Pholadomya*, *Corbula*, with a few others which I have not been able to identify. The Echinida are represented by species of *Cidaris* and *Spatangus*, and there are also two or three species of corals.

Among the shells which are now extinct one of the most noticeable is "*Trigonia semiundulata*" (M'Coy). This shell has not been found elsewhere in Tasmania, but I have seen it in similar formations on the shores of Port Phillip. It is worthy of remark that the recent *Trigonia*, of which we have two representatives, has not been found at all in the Table Cape beds. There is also a good specimen of a *Cypræa*, which is found nowhere else in Tasmania, and seems to be intermediate between *C. eximia* and the recent *C. umbilicata*, both of which are here found as Tertiary fossils. The collection includes a species of *Terebratula*, a *Trochus*, and a small *Voluta*, which I have not seen before.

There is further evidence afforded by leaf impressions in the sandstone, and fragments of lignite, to connect these beds very closely in geological age with the extensive Tertiary formation in and around Launceston, and on both banks of the Tamar, which I have also ascertained to be anterior to the great outflow of basalt, which extends from near Kerry Lodge to Evandale and the North Esk. They are also thus allied to the freshwater limestone which was formerly quarried in the outskirts of Hobart Town, and that which is still worked on the opposite side of the Derwent. These were described by Strzelecki many years ago, as the highest formation in geological sequence in Tasmania, and his description still holds good, the post-tertiary and alluvial deposits which are common in the basins of modern rivers, and on the existing coast-line, being of course excepted.

The igneous rocks of Table Cape, specimens of which have also been presented by Mr. Hainsworth, are exceedingly interesting, but can only receive a passing notice here. They present every variety from pumice-like scoriæ to fine-grained crystalline diorite, but may be classed under two distinct heads,—basalt and trap. The age of the latter and its exact relations to the sedimentary rocks it is not easy to fix, but a reference to a geological chart of the locality, prepared nearly ten years ago, when I was accidentally detained for two days in the neighbourhood, confirms the theory which I have latterly held of its being more recent than the conglomerate last described. It forms the projecting headland of Table Cape, and rises with a nearly vertical seaward face to a height of 583 feet. It is undoubtedly older than the Tertiary strata, and probably afforded a shelter under the lee of which they were quietly deposited during a long series of years; where, too, they rested undisturbed until the period of the tremendous eruption of basalt, which, breaking through the previously weakened crust at many points simultaneously, elevated a great portion of the land to its present level, and may be said to have closed the geological history of the North Coast.

# METEOROLOGICAL AND BOTANICAL ABSTRACT FOR THE AUTUMN QUARTER, 1869.

### OBSERVATORY, HOBART TOWN.

| Months. | Mean in Shade. | | Max. and Min. in Shade | | Mean Solar Intensity Black Bulb Insolated. | Mean Terrestrial Radiation on Grass. | Wind. | | Rain. | | Total Evaporation exposed to open Sky. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pressure.—Barometer corrected to 32°. | Mean Temperature of Air. | Maximum of Air. | Minimum of Air. | | | Prevailing Currents. | Force. | No. of Days. | Total Amount collected. | |
| | Inches. | ° | ° | ° | ° | ° | | lbs. | | In. | In. |
| March .. | 29·916 | 59·65 | 72·5 | 48·5 | 103·16 | 46·98 | N.W., S.E. | 41·10 | 9 | 1·58 | 3·75 |
| April .. | 30·019 | 56·46 | 66·0 | 47·0 | 88·93 | 45·33 | N.W., S.E. | 40·95 | 2 | 0·50 | 1.76 |
| May .. | 29·983 | 49·94 | 58·0 | 43·0 | 75·37 | 40·44 | N.W., S.E. | 9·36 | 14 | 3·07 | 1·11 |
| Mean.. | 29·972 | 55·35 | 65·5 | 46·1 | 89·15 | 44·25 | N.W. S.E. | 30·47 | 25 | 5·15 | 6·62 |

The Mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

FRANCIS ABBOTT, Private Observatory.

## *Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Autumn Quarter* 1869.

March 12.—Tips of Hornbean commencing to turn yellow.
„ 12.—Coe's Golden Drop Plum ripe.
„ 15.—Seckle Pear commencing to ripen.
„ 17.—Tips of Elm commencing to turn yellow.
„ 22.—Horsechestnut leaves turning brown.
„ 26.—Ash leaves commencing to fall.
„ 28.—Oak ditto.
April 8.—Coe's Late Red Plum commencing to ripen
„ 10.—Chinese Chrysanthemum commencing to flower.
„ 14.—Elm leaves commencing to fall.
„ 22.—Mountain Ash leaves ditto.
„ 28.—Black Mulberry ditto
„ 30.—Seeds of Hornbean ripe.
May 8.—First Medlar ripe.
„ 18.—Coronilla glauca commencing to flower.
„ 20.—Photinia serrulata ditto.
„ 24.—Diosma alba ditto.
„ 25.—Spiræa prunifolia flora pl. ditto
„ 26.—Ailanthus gladulosus leaves all shed.

NOTE.—The Hornbeam was three, Coe's Golden Drop Plum twelve, Horsechestnut three, Oak two, Mulberry two, Medlar two, and Photinia ten days earlier this year than last. Coe's Late Red Plum was seven, Elm two, and Ailanthus two days later. The time of the remainder was the same as last year.

# ROYAL SOCIETY.

## JUNE, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, 8th June ; T. Giblin, Esq., in the chair.

Mrs. R. Walker, who had been previously nominated by the Council, was, after a ballot, declared duly elected as a member of the Society.

The Secretary, Dr. Agnew, laid on the table the usual returns for the past month, viz.,—

1. Visitors to Museum, 596.
2. Ditto to Gardens, 1009.
3. Plants. &c., sent from Gardens.
4. Time of leafing, flowering, &c., of a few standard plants in Botanic Gardens.
5. Books and Periodicals received.
6. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq., table and summary for May.
2. Port Arthur, from J. Boyd, Esq., table for April.
3. Swansea, from Dr. Story, tables for March and April.
4. Melbourne, from R. L. Ellery, Esq., table for April.
5. New Zealand, from the Government, tables for March.
6. Brisbane, from Queensland Government, tables for March and April.
7. Sydney, from G. R. Smalley, Esq., tables for February and March.
8. Westbury, from C. Belstead, Esq., table for May.

Also the following reports from the Government of Victoria :—

1. Report of Mining Surveyors and Registrars, Victoria, for quarter ending 31st March, 1869.
2. Report of Registrar-General, Melbourne (Vital Statistics), for quarters ending 31st December, 1868, and 31st March, 1869.
   Registration of imported live stock for same period.

The presentations were as follows :—

1. From J. Hull, Esq. A Falcon *(Falco melanogenys)*.
2. From J. Maclaine, Esq., Clarke's Island, *per* Mr. M. Allport. An Avocet *(Recurvirostris rubricollis)*.
3. From Mr. R. Ransome, Southport, *per* T. Stephens, Esq. A specimen of Felspar Porphyry, and the Ear-bone of a Whale.
4. From the Seymour Coal Company. Slab of Shale with numerous plant impressions, from Seymour Mines. A specimen of Coal from West Wanganui Inlet, New Zealand.
5. From Mrs. Stagg. Eight Limestone Fossils (Tasmanian).
6. From P. Ferguson, Esq,, of the *Ceylon Observer*, *per* Mr. Langley, A Letter of the Chetty Merchants (Tamils) of Southern India and Ceylon, with an explanatory note.
7. From Mrs. Ransly. A Lizard with double tail.
8. From Mr. S. H. Wintle. Seventeen named specimens of Tasmanian Coleoptera, with note.
9. From J. Maclanachan, Esq. A Pheasant (a cross between English and Chinese breeds).
10. From R. L. Holmes, Esq. Transactions and Proceedings of New Zealand Institute, vol. 1.
11. From W, A. B. Gellibrand, Esq. Seventy-nine Photographs of Machinery in the Leeds Exhibition.

[These Photographs were presented to the donor by H. Denny, Esq., Secretary of the Leeds Literary and Philosophical Institution.]

Mr. M. Allport wished to take the present opportunity of remarking that he had recently seen in the *Student*, for December, 1868, a paper on the Salpæ, which confirmed him in the opinion he had hazarded at the last meeting in reference to the occurrence of a small Crustacean in the empty case of one of these animals.

Mr. Barnard laid upon the table a small specimen of fine crystal Sugar, manufactured from Beet-root, which had been taken from a sample of 28 lbs. exhibited at the late Agricultural Show held in Sydney, and read a paper upon the subject.

The Chairman remarked that he thought the thanks of the society were justly due to Mr. Barnard for bringing the matter before the meeting. He was certain it would be of great importance to the colony if the manufacture of beet sugar could be introduced, although at first perhaps only on a small scale, and by private individuals with simple apparatus, as described in the paper just read. In former years he had considerable experience in the growth of beet root, and was satisfied that this climate was peculiarly favorable for it. He could not indeed imagine why it was not more extensively cultivated, as it was a hardy plant, easily managed, and superior in almost every respect as a nutritive root crop to the mangold wurtzel. The produce of the two he thought would be about equal in weight, as the beet could be planted much closer than the mangold.

Mr. Morton Allport moved a vote of thanks to Mr. Barnard for his interesting paper, expressing his opinion that it was a pity gentlemen who had left the colony, and who had an opportunity of observing what was doing in other colonies, did not take some interest in the matter, as Mr. Barnard was doing, and forward reliable information upon the subject. There could be no doubt it would be to the advantage of the colony.

In reference to the subject, Mr. Napier recollected that some time ago a quantity of sugar from Sydney was placed in this market, but as it was somewhat peculiar in appearance, it did not command a ready sale; when tried, however, it was found to be so excellent for jams and general household use that it was all quickly bought up. Subsequently it was found that the sugar originally came from France, and was made from the beet root. He had great pleasure in seconding Mr. Allport's motion.

Mr. Davies was sorry more attention was not paid to the manufacture of sugar. It only required a little energy. If it could not be undertaken in the large and profitable manner recommended in the pamphlet issued by Government, it ought at least to be tried by means of the simple and inexpensive process seen by Mr. Barnard in action near Sydney. If this was seen to succeed in a single instance, no doubt many would engage in the process, and in time it might become a matter of considerable national importance.

Mr. Troup (D.A.C.G.), had seen the beet sugar largely produced in Germany, but doubted if in this island it could be manufactured to compete with sea-borne sugar, which was brought so cheaply to our doors. In America the Maple sugar could only be made profitably in the inland region, far from sea carriage. In the event of its being tried, however, he would recommend that the greatest possible care should be taken to procure the best seed, as it was found that the quantity of sugar in the beet varied very greatly according to the sample of seed.

The Secretary remarked that the important point to be determined was the price per pound at which the sugar could be produced by the simple process just described, and suggested that Mr. Barnard would be kind enough to procure from his friend precise information on this point. In reference to the value of beet sugar, in comparison with that of the imported, it was to be recollected that the refuse from the manufacture formed excellent food for cattle, &c., and being always saleable would be a set off in favor of the farmer.

Mr. Barnard expressed his great willingness to obtain the required information, if possible in time to lay before the next meeting.

Further discussion ensuing, the general feeling of the Fellows present appeared to be if the manufacture of the sugar could once be instituted, that the example would generally be followed. In order to promote this object, it was resolved that the Society should suggest to Government the propriety of offering a bonus for the first sample of a certain quantity, say 56lbs., of sugar produced in Tasmania from the beet.

As it was understood that some plants could be obtained from Mr. R. Walker, it was suggested that the experiment might be tried on a small scale at the Society's Gardens, if the very inadequate amount of labour available there would admit of it.

The Secretary having promised to see the Superintendent of the Gardens on the subject, the vote of thanks to Mr. Barnard, and to the donors of presentations, was accorded, and the meeting terminated.

## JULY, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, the 13th July; J. Barnard, Esq., in the chair.

L. R. Castray, Esq., A.C.G., and G. Mace, Esq., who had previously been put in nomination, were, after a ballot, declared duly elected as Fellows of the Society.

The Secretary, Dr. Agnew, laid on the table the usual monthly returns, viz.,—

1. Visitors to Museum, June, 1832.
2. Visitors to Gardens, June, 803.
3. Plants, &c., received at Gardens. From A. Verschaffelt, Ghent, Belgium, 106 varieties of fruit trees, of which 48 arrived alive, 15 doubtful, and 43 dead. From Mr. G. Brunning, St. Kilda, 60 plants. From Mr. J. Harris, South Yarra, 47 plants. From Melbourne Botanic Gardens, 29 plants.
4. Plants supplied from Gardens. To Mr. Brunning, 54 plants, 12 packets seeds.
5. For Burial Ground, Cascade Invalid Depot, 40 cypress plants.
6. Time of leafing, flowering, and fruiting, of a few standard plants in Botanic Gardens.
7. Books and Periodicals received.
8. Presentations to Museum.

*Meteorological Returns—*

1. Hobart Town, from F. Abbott, Esq., table and summary for June.
2. Port Arthur, from J. Boyd, Esq., table for June.
3. Swansea, from Dr. Story, table for May.
4. Westbury, from F. Belstead, Esq., table for June.
5. Melbourne, from R. J. Ellery, Esq., table for May.
6. Sydney, from G. R. Smalley, Esq., table for April.
7. New Zealand, from Dr. Hector, ditto ditto, and report on meteorology for 1868.
8. Brisbane, from E. MacDonnell, Esq., table for May.

The Secretary read a letter of thanks from Professor Newton, of Magdalen College, Cambridge, for specimens of natural history, and publications forwarded by the Society in December last to the Museum and Library of that institution.

Also one from the Secretary of the Anthropological Society of London for a complete set of the transactions of this Society, presented by order of the Council.

The presentations were as follows:—

1. From Dr. Bennett, a crab, from Sandy Bay.
2. From Mr. J. Young, Howrah, eight specimens of Crustaceans (four Crabs and four Prawns), from Kangaroo Point.

[These Prawns have lately been taken in considerable numbers from the mouths of rock cod *(Gadus sp.)* caught in the Derwent, and it is somewhat remarkable that they have not hitherto been found in any other situation.]

3. From Mr. J. Townsend, specimens of Calcareous incrustation round roots of trees, from Sandy Beach at Pittwater.
4. From Mr. W. Johnston, a large seed of tree said to have been taken from the stomach of a Barracouta. Four Coins and one Brass Token.
5. From Mr. Whitely. Silver Coin, value 10 cents, Netherlands, 1849.
6. From Mr. S. H. Wintle. Specimen of Cleithelepis, from New South Wales, discovered by the Rev. W. B. Clarke. A Mineral specimen from a vein in the Mudstone, Huon Road.
7. From Mr. H. Hull. A Malay Kris.

8. From L. R. Castray, Esq., A.C.G. A letter written in the New Zealand language, with translation. [This letter, addressed by one native to another, was picked up near Taranaki.]

Six specimens of Woods from Madagascar, with Botanical, French, and Native names attached.

The attention of the meeting was directed to presentations of books to the table, from the Royal Geographical Society, Royal Asiatic Society, Linnean Society, Geological Society, Zoological Society of London, and Royal Institution of Great Britain.

Mr. Barnard read a paper on the Esparto grass, supplementary to his former observations on the same. From information referred to in the paper, it was evident that the cultivation of the grass could not be attempted in the colony with any chance of success.

After some discussion of a conversational character, votes of thanks were accorded to Mr. Barnard, and the donors of presentations, and the meeting terminated.

## AUGUST, 1869.

The usual evening meeting of Fellows was held on Tuesday, 10th August, J. Barnard, Esq., in the chair.

The Secretary, Dr. Agnew, laid on the table the usual returns for the past month, viz.:—

1. Visitors to Museum, 707.
2. Ditto to Gardens, 1251.
3. Plants and seeds sent from, and received at, Gardens.
4. Times of leafling, flowering, and fruiting of a few standard plants in Botanic Gardens.
5. Books and Periodicals received.
6. Presentations to Museum and Library.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq., table and summary for July.
2. Westbury, from F. Belstead, Esq., table for July.
3. Port Arthur, from J. Boyd, Esq., table for July.
4. Melbourne, from R. J. Ellery, Esq., table for June.
5. Sydney, from G R. Smalley, Esq., table for May.
6. New Zealand, from Dr. Hector, table for May.
7. Perth, Western Australia, from W. H. Knight, Esq., table for June.

The presentations were as follows:—

1. From F. Aubin, Esq., a Sun Fish (*Orthagoriscus sp.*), washed on shore at Spring Bay.
2. From Mr. W. J. Thomas, a large specimen of "Native Bread" (*Mylitta Australis*) ploughed up at Bellerive. [This specimen weighed 21lb. 10oz.]
3. From Mr. J. Rossitor, specimens of the Maori Hen of New Zealand. An English Partridge. Three Bones of Foot of Moa (*Dinornis sp.*)
4. From Mr. H. Hull, three Small Fish from Derwent.
5. From H. Bilton, Esq., Glenorchy, double Head of Calf. [This specimen has two perfect mouths, and four eyes, but only one pair of ears. The Calf from which it was taken lived three days, and the cow which produced it had one on a former occasion with three legs.]
6. From Dr. Cox, of Sydney, a large number of Shells.
7. From Mr. J. Jones, a small Turtle from Lady Elliott's Island.
8. From J. Barnard, Esq., a package of Seed of Sugar-beet for distribution.
9. From the Institution of Engineers in England, a complete Set of the Transactions of the Institution, in eleven volumes.
10. Specimens of new species of Helix (*Helix Allporti.* Cox.)
11. From Mr. Roblin, a Black Cockatoo (*Calyptorhynchus xanthonotus*).
12. From Mr. Gates, Jerusalem, ditto.
13. From Miss S. A. Manley, four specimens of *Chamostrea*, from Carlton Beach.
14. From Miss S. P. Edwards, eleven copper Coins and Tokens.
15. From J. A. Youl, Seventh Annual Report of Inspectors of Salmon Fisheries, England and Wales.
16. From Rev. R. E. Dear, specimens of laminated quartz and iron ore, a number of flint implements of the Aborigines, collected by Mr. Rollings, of Forcett.
17. From J. Barnard, Esq., specimens Cinnabar Ore, from the Cudgegong, New South Wales.

The Secretary announced that it had been decided by the Council to hold the annual microscopical meeting on Tuesday, the 16th November, when it was hoped that every Fellow possessing an instrument would take part in the exhibition; and, in the meantime, endeavour to procure new and suitable objects, so as to render the meeting as attractive as possible.

Mr. Barnard read some notes on the cultivation of the Sugar Beet, supplementary to a former communication on the same same subject, and took the opportunity of presenting a package of the seed for distribution; also, a small tract on "The Sugar Beet, its importance, cultivation, and management," by Jules Joubert, Secretary to the Agricultural Society of New South Wales.

Mr. Davies suggested that a portion of the seed should be sent to Dr. Coverdale, who he believed was now giving the growth of Beet a fair trial on the farm of the Queen's Orphan Asylum. As Dr. Coverdale was now making use of seed sent from Europe by Mr. John Walker, he would thus be enabled to institute a comparison between the seeds.

Mr. Morton Allport called the attention of the Fellows to an interesting scientific fact, connected with the Salmon experiment, viz., that the few pairs of Salmon trout (*Salmo trutta*) which were retained in a freshwater pond, purposely prepared for them, had deposited spawn in which the embryo fish were now distinctly visible. The parent fish were hatched in May, 1866, and are therefore nearly four years old, their weights varying from three-quarters of a pound to one pound and a half.

Mr. Stephens, in bringing under the notice of the Fellows an apparatus for applying sulphur to plants, by means of a common pair of bellows, in a thorough and economical manner, observed that the use of sulphur was now largely adopted in Madeira, where it had quite cured the disease in the vine *(Oidium)* which had been so destructive of late years. Sulphur thus applied would in fact destroy all vegetable blight, which was of a fungoid character (as was the case with the *Oidium*), and would no doubt be efficacious against the fire blight, which for some years had been so prevalent among the apple trees. [The instrument, which is very simple in construction, and could readily be made by any tin-smith, will be exhibited for some time in the Museum.]

Mr. F. Abbott read a paper on Nobert's test lines, Moller's Diatom Type Slide, and recent improvements in the construction of Microscopes; which was listened to with much attention. Mr. Abbott intimated that he intended exhibiting some new Micrometers, and other novel objects of interest on the evening of the Microscopical meeting.

Mr. Davies thought the thanks of the Society were specially due to Mr. Barnard, for the manner in which he had, on more than one occasion, brought the subject of Sugar Beet cultivation under notice, and begged to move accordingly.

Mr. Buckland seconded the motion, which was carried, and the usual vote of thanks having been given to Mr. Abbott, for his interesting paper, and to the donors of presentations, the meeting broke up.

# THE MANUFACTURE OF BEET SUGAR IN NEW SOUTH WALES.

### By James Barnard.

During my recent visit to New South Wales I bore in mind my connection with the Royal Society of Tasmania, with a view, if possible, to be useful to its interests upon my return, by bringing under notice any important facts that seemed to me to claim its attention.

Accordingly, I lay upon the table a Catalogue of the Intercolonial Exhibition for 1869 of the Agricultural Society of New South Wales, representing the efforts of industry in the various departments of science and art, in addition to the more immediate results of the Society in the application of skill, energy, and capital, to pastoral and farming pursuits. The exhibits were 1708 in number, and none to my mind possessed more attraction than the sample of sugar, 28lbs. weight, manufactured from beet at Summer Hill, near Bathurst. I was courteously favoured with a specimen, which I placed in a phial; and although from the extreme smallness of the quantity it is scarcely worthy of presentation to the Society, still I thought, as coming from the first exhibition of the kind in New South Wales, and as a means of identity to those unacquainted with its quality, it might not prove altogether unacceptable.

Other considerations contributed to fix my interest upon this subject. One was, that the advantages of the growth and manufacture of beet root sugar in Tasmania had been recognised both by the Legislature and the Government, and had led to the wide circulation of a valuable pamphlet throughout the colony in recommendation of this industry.

Another circumstance was, that while staying up in the interior I met a gentleman, possessing a large establishment, who informed me that he grew the beet and manufactured sugar sufficient for his own domestic consumption; and he described to me his *modus operandi* pretty well in the following terms, viz :—

"Sow the beet in soil of medium quality; transplant in rows eighteen inches apart, and twelve inches distant; wash the beet carefully, scraping off all dirt, and remove the heads. Cut up, and press out juice thoroughly, which boil in a copper; then add lime, dredged in until all acidity is removed, as per test paper. Continue to boil until it draws out to a thread; then stop. Take a beurette or funnel to a pin's head point, with a false bottom, perforated. Then place animal charcoal (shin bone of beef) on the false bottom or shelf within the beurette, and pour the syrup over the charcoal, which is to be beaten up fine, letting it drain through the funnel-head, this will be molasses, the grains of sugar being left on the surface of the charcoal, which scrape off. Then, to dry the sugar, put it into a pan, and place in "water-jacket"; *i.e.*, a square iron box, double, a space of two inches for water on each of three sides; the fourth is the door to one shelf in the middle, and the bottom forming another, on which shelves the sugar is placed, being completed by a closed door. Make a fire of vegetable charcoal on bed of sand, placing in the hot water. Place the "water-jacket" upon it until the sugar is dried. There is a valve on the top for escape of moisture. The object is equal temperature. Thus, sand, charcoal, water, shelves, sugar."

It had been my first intention to try this experiment myself on a small scale before submitting any communication to the Royal Society; but deferring to the suggestion made to me at a meeting of the Council this afternoon, I at once lay the process before the Society for trial, to enable any one willing to test it.

I will only add, in conclusion, that the Agricultural Society of New South Wales has a periodical for the publication of its transactions and correspondence; and that I had the pleasure, through a gentleman, of establishing relations between that Society and the Royal Society of Tasmania in the exchange of its papers. The first supply will, I expect, arrive by the next steamer from Sydney.

# THE GROWTH OF BEET-ROOT AND MANUFACTURE OF SUGAR.

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By James Barnard.

Acting upon the desire expressed by the Royal Society, on the occasion of my reading a short paper on the manufacture of beet-root sugar, I have been in communication with a gentleman in New South Wales with a view to procure further information, and have now the honour to submit the results.

Accordingly, I have the pleasure to place at the disposal of the Royal Society a small bag of the seed of the Sugar Beet, of the variety known as the White Silesian, and considered to be the best, which I have procured from Sydney; and although the quantity is small, being only enough to sow an acre and a-half of land, it may prove sufficient for the purpose of experiment. Distribution of this seed should, I suggest, be made, as far as it goes, to such persons as take an interest in the subject, and who would engage to sow a patch of ground and register the results.

Very valuable information is contained in a short elementary treatise, on the importance, cultivation, and management of the Sugar Beet, of which I present to the Society two copies that I received from Sydney, and suggest the desirability of its being republished in its transactions *in extenso.*

An article in the accompanying Bathurst *Free Press* will also be found not without interest, as announcing the intention of a gentleman in that district, Mr. J. F. Clements, the successful exhibitor of a sample of the beet sugar at the recent Intercolonial Exhibition in Sydney, to devote his best energies in the prosecution of this most important industry; and I am informed that Mr. Clements has obtained the services of an experienced practical man, in order to put the matter thoroughly to the test.

Connected with these efforts, I have it on the authority of the Secretary of the Agricultural Society of New South Wales, that it is Mr. Clements' intention to publish the full results of his operations in the journal of that Society, which will consequently be available to our agriculturalists in due course, as that publication is now regularly placed upon the table of the Royal Society.

Among the implements and machinery shown at the exhibition before alluded to, in class 201, was exhibit 871 a., Youngman's Patent American Sugar Evaporator and Refiner. The price was £47 10s., and the exhibitor was Mr. Robinson, of George-street, Sydney. It is described as "consisting of defecating, evaporating, finishing pans, and filters, with furnace, registers, dampers, and chambers, which enable the whole operation, from the strained neutralised juice to the refined syrup, (in which state it is the best possible for granulation), to be carried out in one continuous operation, with a capacity of from 8 to 10 gallons per hour, and with a consumption of fuel exceedingly small."

It must be a source of satisfaction to learn that Dr. Coverdale, the Principal of the Queen's Asylum, has determined to initiate the cultivation of the sugar beet, and its subsequent manufacture, at the New Town Farm; and no better employment could be given to the band of juvenile workers placed under that gentleman's control.

The same enlightened views which led to the circulation in the community of an abridgment of Baruchson's instructive pamphlet, will, doubtless, influence the Government to give encouragement to the proposed experiment, and sanction the purchase of the requisite machinery, to be obtained at such moderate cost, for the different processes of the manufacture.

A few figures here may serve to show the national importance of this useful industry. It appears, then, from *Nowell's Statistics of Tasmania for* 1868, that the annual consumption of sugar in this community averages about 70lbs. per head of the entire population. This makes a total of say 7,000,000lbs., or 3500 tons yearly, and exceeds in value £100,000 sterling. Hence it is apparent that there is ample scope for the most extensive operations, and that no apprehension need be entertained of over-producing this article of prime necessity.

Adverting now to the specific question of cost, which was put to me in reference to the adoption of this as a domestic manufacture upon a limited scale, I have not been able to procure data to show this with sufficient precision; and I apprehend that, after all, it could only be arrived at approximately, as it would evidently vary in almost every family, according to the degree of skill and experience brought to bear in the culture of the root, and its subsequent manipulation.

Comparison with the home manufacture of bread and beer, as well as with the products of the dairy, best illustrates, I think, the question—"Will it pay?" Many people, we know, bake their own bread, and brew their own beer, as well as make their own butter and cheese, irrespective altogether of the mere question of cost, but simply because it suits them to do so, either from living at an inconvenient distance from the usual distributors of these necessaries of life, or from the possession of the requisite means and appliances, or for other reasons. So, with regard to sugar, it might fall in with family arrangements, in some instances, to apply any available domestic strength to the prosecution of this valuable industry.

Taking up the inquiry, however, upon broader grounds, it may suffice to point out the fact that the beet-root contributes more than one fourth of all the sugar now used in the world, having in many European markets nearly supplanted the sugar-cane, as affording convincing proof of its being a paying industry. Hence, the conditions of success being the same, there can be no reason to doubt that, once introduced into these colonies, the extraction of sugar from beet would soon grow into a staple manufacture of the first magnitude. Much, of course, would depend upon the Legislature, in the recognition of its national importance by sanctioning only such fiscal measures in relation to the undertaking as should have the effect of imparting a direct stimulus and encouragement to this most important manufacture.

# NOBERT'S TEST PLATE, MOLLER'S DIATOM TYPE SLIDE, AND MODERN MICROSCOPES.

By Francis Abbott, F.R.A.S., F.R.M.S.

Nobert's Test Plate, as an instrument for trial, is admirably adapted for comparing the quality of object-glasses, supplied by different makers,and every microscopist who possesses a first-class instrument naturally desires to know what it is capable of doing; for when the power and quality of his lenses are known to him, he is convinced it would be only a waste of time to try them further.

One of the most important tests that the properties of a microscope can be tried by is to clearly "resolve" the very fine lines of the frustules of the *Diatomaceæ*. The value of minute *Diatomaceæ*, is, in their surface markings, which are admirable test objects for the higher power of the microscope. This test was first made known by Messrs. Harrison and Sollitt, of Hull, but unfortunately as a standard measure, a great difference exists in the fineness of the markings in specimens of the same species obtained from different localities. In the *Amphipleura-pellucida*, the number of *striæ* range as low as 34, and many specimens present 60, 70, and 80 in 1·1000 of an inch. *Naviculæ-rhomboides*, range between 30 and 50 in 1·1000 of an inch, so that some specimens may be resolved with a 1-5th, a 1-4th, a 4-10th, or even a half-inch objective, while others require a 1-8th, or a 1-10th, or even a higher power. The first of the *Diatomaceæ* on which the lines were seen, was the *N. Hippocampus*, of Ehrenberg, by Pritchard and Queckett, in the year 1841. In 1844, Mr. Sollitt was in London, and showed the lines on the *N. liniata*, of Harrison, to the late Mr. Ross, with a 1-8th of Nachett's; at that time Mr. Ross could not bring them out with a very fine 1-12th he had just finished. This same Diatom *N. liniata*, has an average of about 60,000 *striæ* to the inch, which can now be well seen with a good ¼-inch objective.

For the purpose of testing this resolving power of microscopes, F. A. Nobert, of Pomerania, has adopted a method only known to himself, of ruling lines to a known scale of exceeding fineness, so close that physicists have declared it impossible they ever can be seen, and all trials hitherto have resulted in failures to resolve the finer lines of these plates.

Nobert's test is a series of groups of fine lines ruled parallel on thin glass, such as used for covering, and will admit of the focusing of high powers when reversed and secured on the glass slide; different plates contain a different number of groups, ruled to different scales, some have 30 bands or groups, the coarsest having its lines 1-1000th of a Paris line apart, and the finest being 1-8000th—each group or band being about 1-2000th of an English inch in width, and the whole 30 occupying a space perhaps a little more than 1-50th of an inch.

The plates now most in use have 19 bands, the first or coarsest being ruled to 1-11,240th of an English inch, and the finest to 1-112,668th of an inch. It is a difficult matter for the mind to appreciate such minute divisions, yet it is essential it should conceive them to prepare it for estimating the difficulty of seeing and counting such lines.

Is it possible for human art ever to make an instrument capable of rendering lines 112,668 to an inch visible. Is there anything in the laws of light which renders it impossible to see lines so close, and is it therefore uselesss for the optician to attempt to improve the microscope beyond a certain point? Or, for the naturalist to try any further investigations on the structure of tissues beyond what the present existing instruments have shown. This problem is the exact parallel of that in testing the quality of the telescope for separating double stars. In 1855, Professor Queckett, asserted that "no achromatic has yet been made capable of separating lines closer together than 1-75,000th of an inch." "Mr. Ross found it impossible to ascertain the position of lines nearer than 1-80,000th of an inch." "Mr. De la Rue was unable to resolve any lines on Nobert's test-plate, closer than 1-81,000th of an inch." "Dr. W. B. Carpenter says, that no objective will, probably, ever be able distinctly to resolve lines closer than 1-84,000th of an inch." If these observations are correct, the existence of lines finer than this is a matter of faith rather than sight; there can be no reasonable doubt, however, that lines do exist, and the resolution of them would evince the extraordinary superiority of any objective, or any system of illumination, which would enable them to be distinguished."

The late Professor J. W. Baily, claimed to have seen lines as close together as 1-100,000th of an inch, and Messrs. Harrison and Sollitt of Hull, claimed to have measured lines on the Diatom *Amphipleura-pellucida*, as fine as 120,000, to 130,000 to the inch. R. C. Greenleaf of Boston, and Mr. Charles Stoddard, were well satisfied that they saw the lines 90,000 to the inch, with a Tolles 1-5th, and afterwards Mr. Greenleafe saw the same lines very distinctly with a Tolles 1-12th. Dr. J. J. Woodward, of Washington, states that with mono-chromatic light, and Powell and Lealand's 1-50th, and 1-25th, and 1-16th objectives a Hartnach's immersion No. 11, and Wales 1-8th with amplifier, he satisfactorily resolved the 29th and 30th bands of Nobert's test plates, the lines of which were 1-83,917 and 1-86,334 to the inch.

Dr. Woodward lately received a Nobert's test plate of 19 bands, the photographs procured from which were lately brought under the notice of the Royal Microscopic Society by the hon. secretary, Mr. Jabez Hogg, the covering glass on this test-plate was too thick for a 1-50th objective, but with all the others he was able to resolve the 17th band, 101,000 to the inch, the 18th and 19th he was unable to resolve. Both Dr. Curtis and Dr. Woodward have photographed the 16th, 17th, 18th, and 19th bands with a Powell and Lealands' 1-25. In these photographs the lines of the 16th and 17th bands can be counted with some difficulty, but the lines of the 18th and 19th cannot.

Dr. Barnard found the counting of the lines to be attended with a great difficulty, in addition to which there is another trouble, the whole width of a band is not in perfect focus at the same time, and the slightest change in focal adjustment renders it extremely difficult to fix, even with the cobweb micrometer, the last line counted.

One way of verifying the accuracy of the divisions of Nobert's test lines, is by counting them in a measured space. If 46 equidistant lines are ruled in the space of 1-2,000th of an inch, the inter-spaces must be at the rate of 90,000 to the inch. An error of one line more or less in counting the whole on such a band, would decide the rate of interspaces to be either 92,000, or 88,000, instead of 90,000 to the inch.

The foot note to Mr. Stodder's paper in the "American Naturalist," deserves notice. Speaking of Dr. Woodward's photographs, the author says, "The first fifteen bands are sharply and clearly resolved into the true lines; the fifteenth band, however, (which is ruled to the 90,000 of an English inch), requires a hand-glass magnifying four or five diameters, to show its lines distinctly." Dr. Woodward gives the following directions for counting the lines in the highest bands that can be resolved. "If a cobweb micrometer is used, the micrometer eye-piece should be firmly clamped in a stand screwed to the table, so that the eye-piece is close to the end of the microscope-tube, but not to touch it, a piece of black velvet being used to complete the connection. The motion of the micrometer-screw now communicates no tremor to the microscope, and all difficulty in counting the lines seen (whether real or spurious) disappears." Still better than this is the following method:—"The microscope being set up in a dark room, as though to take a photograph, and the eye-piece being removed, the image of the band to be counted is received on a piece of plate-glass in the plate-holder, and viewed with a focusing-glass, on the field-lens of which a black point is marked; as the focusing-glass is moved on the plate from side to side, the black point is moved from line to line. The lines may thus be counted with as much ease and precision as though they were large enough to be touched with the finger."

These photographs support an opinion given by Mr. Wenham many years ago, that the time would come when photography would reveal minute detail much plainer than it can be seen in the microscope. The reason of this is obvious. In photography the object can be illuminated by highly condensed sun-light, which will produce intense black shadows, quite unendurable to the eye, and it was with such illumination that these photographs were obtained with a Spencer 1-12th, and a Tollis 1-5th, *both dry objectives*. Dr. Woodward made five counts of the 19th band, which gave him a mean of 110,820 to the inch. The number, according to Nobert, is 112,668. Dr. Barnard counts for the 15th band 91,545; Nobert 90,074. There is a similar alleged variation in the striation of Diatomaceæ, among individuals of the same species, *Pleurosigma fasciola*, has been specially designated by Dr. Wallich, as very inconstant in its markings, as well as *Pleurosigma strigosum*, *Navicula-rhomboides*, and *Nitzschia sigmoidea*.

With the 1-8th and the 1-12th by Ross, and the 1-20th by Smith, in the possession of the Royal Microscopic Society, and with a 1-8th, a 1-12th, a 1-16th, and a 1-25th, by Powell and Lealand, all dry objectives, on a new 19-band plate, all the bands beyond the 12th seemed imperfect, the lines were not separated. But with a 1-10th and a 1-18th by Hartnarch, of Paris, a 1-16th by Merz, of Munich, and a 1-20th by Nobert, all *immersion objectives*, straight and well-defined lines were separated as far as the 15th band inclusive. Several trials by sunlight proved that the lines were thus rendered more visible, but the immersion objectives maintained their superiority by all methods.

Continental opticians and men of science have been aware of the merits of the immersion system for some years past; and, from its having received so little attention in England, continental makers do not scruple to say that the English no longer take the lead, either as opticians or microscopists.

The advantage claimed for immersion objectives are:— greater working distance between the object and objective, increase of light, and superior definition and clearness in the optical image, which image is obtained by much simpler illumination than that required in using high-power, dry objectives.

In its construction the objective is immersed in water, that is, there is a film of water between the front of the objective and the object, or thin glass covering it. An *amplifier*, is an achromatic combination inserted in the compound body of the instrument, to increase the power of the objective and eye-piece. *Angle of aperture* is the angle in the surface of the front lens, at which light will enter the objective; the greater the angle of the aperture, the more light, and to a certain extent greater resolving power; there is no evidence, however, for the statement that the resolving of test-diatoms and Nobert's test-lines is a question of *angular aperture*, since the 1-12th inch object-glass may have its *angle of aperture* extended to 170 deg., the utmost limit compatible with the reception of rays from any object; nothing is therefore gained in this respect by a reduction of the focal distance.

Before entering upon the investigation of test-objects, it would be well for every microscopist to ascertain the true magnifying powers and properties of his own instrument, English, American, and Continental European makers differ in distinguishing their instruments ; each maker has generally his own system. The theoretical power of a microscope is usually measured from an arbitrary standard of 10 inches; thus a one inch is said to magnify ten diameters; a $\frac{1}{4}$ inch, forty diameters. If the standard is taken at five inches, as it is by some, then the power is but one-half as much. The power of the microscope is that of the objective multiplied by that of the eye-piece; if the objective magnifies ten diameters, and the eye-piece ten, the result is one hundred diameters.

In a scientific point of view, and next to Nobert's test plate we have a marvellous specimen of art in Herr Möllers, diatom type slide; this single slide contains over 450 diatoms, the whole are arranged and scientifically classified into four series by Herr Grunow, of Vienna, and within such a compass that the whole can be examined simultaneously with a two inch, objective, and under dark ground illumination they present a singular and beautiful appearance.

There is issued with the slide a "Systematic Catalogue," which admits of easy reference. Thus, there are nineteen objects belonging to the genus Epithemia the same number of Eunotia, five of Merediones, thirteen of Synedra, &c., &c. In the catalogue they are classed in families,—as *Epithemiæ Meridionæ. Diatomeæ Tabellariæ, Surireleæ, Nitzschiæ Amphipleuræ, Cocconeidæ, Achnantheæ, Cymbelleæ, Gomphonemeæ, Naviculeæ, Isthemiæ, Biddulphiaceæ, Eupodisceæ, Melosireæ,* and *Chaeto-cereæ.* From this it will be easily seen how to compare the different families together, and how they differ from other groups.

The objects are attached to the covering glass, like Nobert's test lines, which is very thin, so that it allows the use of high powers; both sets of lines on *Navicula Rhomboides* are resolved with a one-twentieth objective, so that each Diatom may be separately examined with deep lenses. The thickness of covering-glass required for focusing under high powers will explain the difficulty of using them. For a 1-12th and 1-16th objective the covering-glass must not exceed ·004 in. For 1-20th, 1-25th, and 1-50th, ·005 in. It was my intention to have shown Möller's Diatom Typen Plate, and Nobert's bands of Test Lines, under the microscope, at the annual soirée which the Council have fixed for the 16th of November, but from a correspondence by the last mail, I learn that they are not to be had, except at a very great price. I have received, however, from members of the Royal Miscroscopic Society, some specimens of diamond writing, &c., equally marvellous and interesting, and much better suited for the purpose, which were engraved and exhibited at the International Exhibition, class 13. The following is a specimen:—"A micrometer with divisions of 1-100th, 1-1,000, 1-2,000th, 1-4,000th of an inch, with 40 parallelograms, each of 1-100,000th of an inch; 40 parallelograms each of 1-200,000th of an inch; 80 parallelograms each of 1-400,000th of an inch; 200 parallelograms each of 1-2,000,000th of an inch; 400 parallelograms each of 1-4,000,000th of an inch; and 400 parallelograms each of 1-8,000,000th of an inch; with squares of 1-10,000th of an inch; 100 squares each of 1-1,000,000th of an inch; 100 squares each of 1-4,000,000th of an inch; and 400 squares each of 1-16,000,000th of an inch. The Lord's Prayer, the Creed, God Save the Queen, Rule Britannia, a geometric coil, the 4,137 letters in the 51 verses of the 1st Chapter of St. John, a poem upon the International Exhibition, from copper plates engraved in the Exhibition, each in a space from 1-1,600th to 1-2,000th of an inch. A Freemason's sign, which can be covered by a pin's point, &c.

There are various means employed for measuring these delicate objects, the best is undoubtedly the position micrometer, the same as the one used with the telescope for measuring the distance and angle of double-stars; but this instrument is both expensive and complicated. The method now in general use is the micrometer eye-piece, this is an eye-piece either positive or negative, having a divided glass micrometer fitted into a brass frame and placed in its proper focus. If the positive eye-piece is used, the micrometer is placed below the field-glass, but if the negative eye-glass is used, then the place for the micrometers is between the two lenses.

To find the value of the lines in the eye-piece micrometer, a glass micrometer is laid on the stage of the microscope, which is divided into 1-100th and 1-1000th of an inch, when the two micrometers are brought into focus with a low power, say a one inch objective, then if every division of 1-100th of an inch in the stage micrometer coincides with ten in that of the eye-piece, it is clear that the lines in the eye-piece micrometer are 1-1000th of an inch, the stage micrometer can now be removed, and every object corresponding to the eye-piece micrometer, under a one inch object glass can be measured to 1-1000th of an inch.

If one of the 1-1000th of an inch of the eye-piece micrometer be divided into four parts by the stage micrometer then every one of these divisions would be 1-4000th of an inch. If with any other power it is found that 1-1000th of an inch on the stage micrometer coincides with ten spaces of the eye-pieces micrometer, then the value of each division in the eye-piece micrometer would be 1-10,000th of an inch. In practice it will be found when high numbers are being observed, and the stage movement too coarse, it will be necessary to use the small milled-head screw at the end of the eye-piece micrometer, so as to bring the lines in each micrometer accurately over each other.

For the information of those who take an interest in this subject, I lay on the table the two volumes of Professor Smith's Synopsis of British Diatomaceæ. In these volumes all the objects are drawn to a scale of 10,000 to the inch, multiplied 400 diameters. Also papers containing some particulars of Möller's Diatom Typen Plate, and Nobert's Band of Test Lines, with Mr. Webb's description of diamond writing and engraving.

# METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE WINTER QUARTER, 1869.

### OBSERVATORY, HOBART TOWN.

| Months. | Mean in Shade. | | Max. and Min. in Shade | | Max. Solar Intensity Black Bulb Insulated. | Min. Terrestrial Radiation on Grass. | Wind. | | Rain. | | Total Evaporation exposed to open Sky. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pressure.—Barometer corrected to 32°. | Mean Temperature of Air. | Maximum of Air. | Minimum of Air. | | | Prevailing Currents. | Force. | No. of Days. | Total Amount collected. | |
| | Inches. | ° | ° | ° | ° | ° | | lbs. | | In. | In. |
| June .. | 29·956 | 48·82 | 65·0 | 30·0 | 91·0 | 30·5 | N.W. | 27·57 | 9 | 1·55 | 1·32 |
| July .. | 30·032 | 49·15 | 62·0 | 33·0 | 88·0 | 30·0 | N.W. | 22·62 | 9 | 1·20 | 1.40 |
| August .. | 29·862 | 51·09 | 72·0 | 34·0 | 102·0 | 29·0 | N.W. | 65·31 | 13 | 2·35 | 1·71 |
| Mean.. | 29·983 | 49·68 | 66·3 | 32·3 | 93·6 | 29·8 | N.W. | 38·5 | 31 | 5·10 | 4·43 |

The Mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

FRANCIS ABBOTT, Private Observatory.

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## *Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Winter Quarter* 1869.

June 10th.—Early Narcissus commencing to flower.
„ 12th.—Maclaura aurantiaca leaves commencing to fall.
„ 14th.—Privet leaves shedding.
„ 15th.—Snow Flake commencing to flower.
„ 30th.—Leaves of Black Mulberry all shed.
July 1st.—Arbutus unedo in flower.
„ 10th.—Garrya elliptica ditto.
„ 12th.—White Mulberry commencing to leaf.
„ 15th.—Almond in full flower.
„ 20th.—Yellow Crocus in flower.
„ 24th.—White Hyacinth ditto.
Aug. 6th.—Sambucus niger commencing to break.
„ 10th.—Common Horsechestnut ditto.
„ 15th.—Elm commencing to flower.
„ 20th.—Poplar commencing to break.
„ 22nd.—Apricot commencing to flower.

NOTE.—The Privet was 4 days, Almond 2 days, Crocus 10 days, Hyacinth 7 days, Elder 6 days, Horsechestnut 5 days, Elm 11 days, Poplar 8 days, and Apricot 8 days *earlier* this year than last. The Maclaura aurantiaca was 2 days, Arbutus 10 days, Garrya elliptica 4 days, and White Mulberry 4 days *later*.

# ROYAL SOCIETY.

## SEPTEMBER, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, the 14th September, James Barnard, Esq., in the chair.

Mr. M. Allport, in the absence of the Hon. Secretary, laid on the table the usual returns for the past month, viz.:—

1. Visitors to the Museum, 1019.
2. Ditto to Gardens, 1572.
3. Plants sent from Gardens.
4. Ditto received at ditto.
5. Time of leafing, flowering, and fruiting of a few standard plants at Gardens.
6. Books and periodicals received.
7. Presentations to Museum and Library.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq., table and summary for August.
2. Port Arthur, from J. Boyd, Esq., table for August.
3. Swansea, from Dr. Story, table for June and July.
4. Westbury, from F. Belstead, Esq., table for August.
5. Brisbane, Queensland, from E. McDonnell, Esq., table for July, and summary of observations for 1868.
6. Melbourne, from R. J. Ellery, Esq., table for July.
7. Perth, Western Australia, from W. H. Knight, Esq., do do.

The presentations were as follows:—

1. From Mr. Oscar Hedberg, a collection of shells from the East Coast of Tasmania. [In calling attention to this presentation, Mr. Allport remarked that many of the specimens were very excellent of their kind, and although not new to the Museum, were valuable for the purpose of exchange.]
2. From Mr. Chaplin, a mineralogical specimen from Black Brush.
3. From Mr. H. McRa, specimens of Lava and calcareous Tufa, also a Spirifer, from Abyssinia, near Bothwell. A stone implement of the Aborigines.
4. From Mr. A. H. Swift, Little Taylor's Bay, two specimens of Iron Ore *(Hematite)* from Point Ventinat.
5. From G. Dinham, two fossil Shark's Teeth from the Lias, near Bath, England.
6. From Mr. C. A. Glover, 15 mineralogical specimens from West Coast of Tasmania. Also specimens of a fibrous plant, supposed by the donor to be a new species, from the same locality.
7. From Mr. G. P. Clifford, Dunedin, two Boulders *(Septaria)* from Moeraki Beach, New Zealand. [These boulders are found in large numbers on the beach referred to, and not elsewhere in New Zealand. They vary in size from that of a cricket ball up to seven or eight feet in diameter, are of calcareous composition, and are remarkable for the regularity of their form, which is almost pertectly spherical. When burned they make an excellent cement.*]

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* One of them has since been divided, and found to be hollow in the centre, the cavity being lined with crystals of Carbonate of Lime.

8. From H. Gichard, H.I.M. ship La Somme One bronze Coin, value 5 cents, one silver ditto, 50 cents.
9. From C. Heron of the same ship. Two copper Coins, Colony of Cayenne, Louis 16th, 1789, and Republic of Berne, 1796.
10. From Mr. J. Walch. A Shilling of Queen Elizabeth; a Farthing of George 2nd, 1741; a copper Coin of French Republic (L'An 5); ditto of one of the Roman Emperors, &c.
11. From Mr. F. E. Bomford. Specimens of Fluke *(Distoma sp.)* from liver of a Shark.
12. From Mr. S. H. Wintle. A Pamphlet on the Progress of Botanical Discovery in Australia. By W. Woolls, F.L.S.
13. From Mr. Kelly. A Brass Basin, probably of Indian manufacture.
14. From Mr. A. McLaren. Specimens of Barnacles from piles of Wharf.
15. From the Secretary of War, United States. Report for 1866; and Report on Epidemic Cholera, 1867. Catalogue of Surgical Section. U.S. Army, Medical Museum, 1866.
16. From the Smithsonian Institution, Washington. Report for 1865.
17. From the Boston Society of Natural History. Proceedings, volume 7, 10, and Nos. 1 to 6 of volume 11. Memoirs of ditto, volume 1, parts 1 and 2.
18. From Essex Institute, Salem, Massachusetts. Proceedings, volume 4, parts 1 and 2 of volume 5, and Naturalists' Directory, No. 1.
19. From American Philosophical Society, Philadelphia. Proceedings volume 10, No. 76.
20. From the American Academy of Arts and Sciences. Proceedings, volume 6.

The special attention of the meeting was called to the very liberal donation of books, some of them of a very expensive character, lately received from the Government and various scientific institutions of the United States. The books had been sent in return for publications of the Society forwarded to the donors, a system of exchange having been initiated some time since through the Smithsonian Institution at Washington.

Mr. M. Allport read a paper on "Net Fishing in the River Derwent," in reference to which several of the Fellows present fully bore out that gentleman's statements as to the permanent damage entailed on the fisheries by the use of the small meshed seine nets.

Special votes of thanks were accorded to the American Government, the Smithsonian, and other institutions, for the donations of books. Also to Mr. Allport for his very able paper. The proceedings closed with the ordinary vote of thanks to the donors of presentations.

## OCTOBER, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, the 12th October, C. Gould, Esq., F.G.S., in the chair.

The hon. Secretary, Dr. Agnew, submitted the usual returns for the past month, viz.:—

1. Visitors to the Museum, 880.
2. Ditto to Gardens, 2,355.
3. Plants and seeds sent from, and received at Gardens.
4. Times of leafing, flowering and fruiting of a few standard plants in Botanic Gardens.
5. Books and periodicals received.
6. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq., table and summary for September.
2. Swansea, from Dr. Story, table for August.
3. Westbury, from F. Belstead, Esq., ditto for September.
4. Port Arthur, from J. Boyd, Esq., ditto, ditto.
5. Sydney, from G. R. Smalley, Esq., Government Astronomer, table for June.
6. Melbourne, from R. J. Ellery, Esq., table, &c., for August.
7. Perth, Western Australia, from W. H. Knight, Esq., table for August.

The following presentations to the Museum were brought under the notice of the meeting:—

1. From Captain Roberts, a Snake and three Centipedes.
2. From F. B. Wilkinson, Esq., a Mountain Duck *(Casarca tadornoides)*.
3. From Mr. W. Exton, Oatlands, a Chestnut-faced Owl *(Strix castanops)*.
4. From Mr. R. Propsting, a Harrier (*Circus assimilis*). [This bird is known as the "Swamp Hawk" of the colony.]
5. From A. H. Maning, Esq., a Sun Dial, made and used by Spanish shepherds.
6. From Mr. H. Turner, an Irish Penny, and a Sydney Token.
7. From Miss Castray, Leaves of Silver Leaf Tree from Table Mountain, Cape of Good Hope; a Damara Lady's Necklace, from South Africa.
8. From Mrs. J. R. Buckland,—A Bullet from a double-barrelled gun, found loaded, on the 30th May, 1859, by the side of two skeletons belonging to the retreating party of Sir John Franklin's expedition, in a boat on the west coast of King William's Island, lat. 69deg. 8min., N., long. 99deg. 24min., W. [Vide "Fate of Franklin and His Discoveries," by Captain McClintock, page 294.] A portion of a Boat's Ensign, belonging to the same expedition, left at the Northern Cairn, Cape Felix, May, 1847, and discovered May, 1859, by Lieut. Hobson, of Lady Franklin's screw yacht Fox. A portion of the Riband of the Order of the Redeemer, of Greece, worn by the late Sir John Franklin. An Almond from the Convent Garden on Mount Sinai.
9. From Mr. W. Knight, jun.,—A collection of Geological Specimens brought by Mr. Glover from the western coast of the Island.

The Secretary brought under notice a model of a Reel invented by Sergeant Eccleston, R.A., Instructor of Artillery, to be used for the purpose of winding up the line in deep sea fishing. A letter descriptive of the manner of using it, and setting forth its advantages, was read.

Mr. Stephens read some "Notes on the occurrence of gold at Port Cygnet."

Mr. Gould was much interested in the information contained in Mr. Stephens' paper, as he had not had an opportunity of minutely examining the country about Port Cygnet. The discovery of fossils in the quarry alluded to, would be of the greatest importance, and he hoped, if any were discovered, they would be preserved for scientific examination. As to the specimens on the table, said to have been obtained from the vicinity of Port Davey, although he had visited that part of the country, several of them were new to him. He would instance more particularly the serpentine, which was much more like that on the North of the Island than any he had seen to the westward. Further information, however, was much required, as the specimens lost a great deal of their interest by not having labels affixed; and geological specimens generally were of very little value if not accompanied by a notice, defining exactly the localities in which they were found.

Mr. J. W. Graves mentioned that gold in small quantities was discovered at Port Cygnet in 1852.

Mr. Stephens was anxious to induce Fellows to send specimens of natural history to the Museum, which, in many respects, was still very deficient. He would refer to one subject alone, that of our land shells. Of these, we had no proper collection, and if any information in reference to them was required, it would have to be sought for in the private museum of a naturalist (Dr. Cox), in Sydney—a circumstance which was scarcely creditable to us.

Mr. Justin Browne observed that at a former meeting he had suggested that lists of such objects as we wanted might be exhibited at all the Post Offices in the interior, and he thought that if our wants were thus made generally known, many people in the country would send contributions.

The Secretary informed the meeting that lists of desiderata for the Museum had been printed and forwarded to all the Fellows, and to many others. Scarce any response was, however, made to the appeal, except by Mr. W. Gellibrand, and also by Mrs. C. Meredith, who had contributed many valuable preparations of our sea-weeds and other objects.

Mr. Graves mentioned he had lately received from Mr. Groombridge, of North West Bay, a black Wallaby. He had frequently seen the Albino variety, but had never seen or heard of a black one. He was inclined to believe it might be found to be a new species. It was now alive at his house for inspection.

Mr. Castray (A. C. G.), in referring to presentation No. 7, observed if it was thought advisable by the Society to make exchanges of plants and seeds with the Cape, Mauritius, or Madagascar, that he would be happy to be the means of effecting such exchange, as he had correspondents in those places. Mr. Castray's offer was at once accepted.

Mr. Graves enquired if there were any berry-bearing wild plants at any of the places named, as such, if suitable to this climate, would be of great value both for our indigenous and acclimatised animals?

Mr. Castray thought there were some at the Cape which might be introduced with advantage.

A vote of thanks having been accorded to Mr. Stephens for his paper, and to the donors of presentations, the meeting terminated.

## NOVEMBER, 1869.

The monthly evening meeting of the Fellows, the last of the session, was held on Wednesday, the 16th November, J. Barnard, Esq., in the chair.

The Secretary, Dr. Agnew, laid on the table the following returns for the past month:—

1. Visitors to Museum, 3204.
2. Ditto to Gardens, 2624.
3. Times of leafing, &c., of a few standard plants in gardens.
4. Books and periodicals received.
5. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq., table and summary for October.
2. Port Arthur, from J. Boyd, Esq., table for ditto.
3. Swansea, from Dr. Story, table for September.
4. Sydney, from G. R. Smalley, Esq., tables for July (printed).
5. Melbourne, from R. L. J. Ellery, Esq., table and notes for September.
6. New Zealand, from Dr. Hector, tables for June and July.
7. Westbury, from F. Belstead, Esq., table for October.

The presentations to the Museum were as follows:—

1. From Captain Garth, an albatross *(Diomedia exulans)*, caught on the East Coast of the colony.
2. From Miss Peck, an English barn owl *(Strix flammea)*, prepared and mounted.
3. From Salmon Commissioners, a Salmon Smolt, caught in the Derwent.
4. From Mr. M. Allport, two fish from Wedge Bay.
5. From the Hon. J. Maclanachan, Esq., a Pheasant, a cross between the English and Chinese varieties.
6. From Mr. J. C. Edgar, Sorell, 7 specimens of Land Shells.
7. From Mr. W. Legrand, 2 specimens of Land Shells. *(Bulimus Tasmanicus.)*
8. From Mr. E. D. Swan, polished specimen of Fluor Spar, from Derbyshire, England.
9. From Mrs. New, Bagdad, for Mr. J. Davies, a brown Trout *(Salmo fario)* caught in the Bagdad creek.
10. From G. Luttrell, shell impressions from Port Cygnet.
11. From Captain Williams, two samples of water from a mineral spring at Spring Bay. Also the tail of a large Tunny, which was driven on shore by a porpoise at Spring Bay. The fish weighed over 400 lbs.

Mr. J. Davies presented for examination a sample of gold, weighing about 1¼ oz., which he could state from excellent authority was obtained by two men, in two days' work by digging at the Black Boy Reef at Mangana.

Mr. Davies also submitted a sample of so-called jewel-sand for the purpose of obtaining the opinion of the Society as to the fact of its containing precious stones. (This sand has been examined under the microscope, but no valuable stones were found to be present; it contained, however, a considerable proportion of fine gold.)

Mr. M. Allport called attention to the presentation of a smolt by the Salmon Commissioners as placing upon record the first incontestable proof of the success of the grand experiment in which the Royal Society of Tasmania had from the first taken so deep an interest. The last of the smolts hatched from English eggs left for sea in October, 1868, and, if not destroyed, those fish must either be grilse or approaching grilse-hood; that is to say fish of from two pounds to eight pounds in weight, whereas the largest of the fish now caught weighs under half a pound, and carries with it a proof of its having but just left fresh water, as the silvery scales came off at the slightest touch, leaving the colour and markings of the parr distinctly visible beneath. It is therefore certain that these smolts are the produce of the Colony, as the parent fish must have returned from sea to deposit the ova from which such smolts were hatched. Doubts have been expressed by many colonists as to the nature of the fish, one specimen of which has been just presented to the Museum, and a slight reference to the subject is therefore necessary. In the first shipment—which arrived in 1864—the only migratory species introduced was the salmon *(Salmo salar)*, while the second shipment—which arrived in 1866—contained two—the salmon and the salmon trout *(Salmo trutta)*,—and it follows that these smolts, caught in salt water, must belong to one of these two species, though one learned gentleman has expressed his opinion that they are river trout *(Salmo fario)*, in happy ignorance that the latter species cannot live in salt water. The second shipment arrived here early in the year 1866. In October, 1867, a portion of the smolts of that shipment left for sea. In October, 1868, the remaining smolts all left except a few salmon trout *(Salmo trutta)*, retained in a pond for breeding purposes. The salmon trout so retained, although well-grown, healthy fish, showed no signs of spawning till the winter just past, and their progeny are now about an inch and a half long. It is, therefore, probable that the fish which went to sea in October, 1867, did not return as spawners till the winter of 1869, in which case the smolt now exhibited can only be the young of the salmon *(Salmo salar)*. Again of the salmon *(Salmo salar)*, about 8000 are known to have left the ponds, and it is probable that about 2000 more ought to be added to that number, while of salmon trout *(Salmo trutta)* not more than 300 fish can have gone—in addition to which it must be remembered that the salmon have been two years longer in the river. In answer to those who unhesitatingly assert that these smolts are salmon trout, it may be mentioned that the first authorities in the world on the Salmonidæ expressly point out that the various species of the genus Salmo in their immature stages closely resemble one another, and that a very slight variation from the normal type, which variation is by no means uncommon, may make it most difficult to determine the species of any single specimen, and we should therefore receive the decisive opinions of gentlemen who have no specimens to refer to with some degree of caution, especially when those opinions are strongly opposed to the probabilities. One specimen has been sent to Dr. Günther (a leading authority on the subject) by the Salmon Commissioners with a view to obtaining his opinion as to its species before handing it to Mr. James A. Youl, to whom it is to be ultimately presented. After all if, with the chances so much against it, these should be salmon trout instead of salmon, the success of the experiment is none the less proved, as if one migratory species can succeed with a few hundreds turned out, how much more likely is the other to succeed when several thousands were liberated.

The Hon. Secretary read a paper by E. D. Harrop, Esq., F.R.M.S., of Launceston on the *Phyllactidium pulchellum*, one of the Confervoid Algæ. Specimens of this, and of several others of the same group, beautifully mounted by Mr. Harrop, were presented by him to the Museum.

The usual vote of thanks (proposed by Mr. Bilton) to the donors of presentations, and the author of the paper, being passed, the meeting broke up, and the fellows adjourned to the large room in which the Society's annual Microscopical Exhibition was being held.

Here twelve instruments were at work with objects in great variety, and, as Fellows have the privilege of introducing ladies to this meeting, the room was filled with pleased and interested visitors. The exhibitors were Messrs. F. Abbott, F. Abbott, jun., Agnew, M. Allport, E. Giblin, W. Johnston, Legrand, Napier, W. Stone, and Roblin.

Mr. Abbott exhibited a great variety of instruments and objects of scientific interest, including groups of Diatoms, test lines after Nobert, specimens of diamond engraving, &c.

Mr. F. Abbott, jun., by means of a binocular instrument, showed a series of metallic substances, embracing Gold, Copper, Iron Pyrites, &c.

Dr. Agnew exhibited specimens of Confervoid Algæ, received from and mounted by Mr. E. D. Harrop, of Launceston.

The circulation in the Tadpole was well displayed by Mr. M. Allport, and by Mr. E. Giblin, who also showed a micrometer, together with various crystals by polarized light, insects, &c., &c.

Mr. Legrand had a series of twelve varieties of Tasmanian Polyzoa.

Mr. Napier displayed some exquisite crystals under polarized light, and also specimens of English Polyzoa.

Sections of Colonial Woods, and other objects, were shown by Mr. W. Johnston, Trinity Hill.

Mr. Stone and Mr. Roblin exhibited the circulation of the sap in the *Nitella flexilis*, and the latter also showed the cup-like covering of the larva of a manna-making insect *(Psylla sp ?)* from leaves of the Eucalyptus, presented by Mr. S. H. Wintle.

The various objects under view were carefully examined by the numerous visitors, many of whom before leaving expressed their sense of the gratification and pleasure which had been afforded to them by the exhibition.

# NET-FISHING IN THE DERWENT.

By Morton Allport, F.L.S., F.Z.S.

During the months of November, December, and January, when the freshets caused by the winter's rains having subsided, and the tidal waters get low and brackish, shoals of fish commence running up from Storm Bay and the open coast into the estuary of the River Derwent, for the purpose of depositing spawn in the shallow landlocked bays, which abound from Rosny and Macquarie Point upwards.

Of such fish, the most valuable are Flounders and Soles; the other being Bream, Mullet, Mackerel, Native Salmon, Kingfish, and a few species of comparatively minor importance.

No exact season can be fixed for the spawning of any of these fish, the time of the deposition of the ova varying in different years from causes of which naturalists are at present ignorant; and even in the same summer, many weeks often elapse between the deposition of the first and last spawn of each particular species. The parent fish having deposited the spawn, remain in the river, safe from the attack of their more formidable marine enemies, till their strength is recruited, and return to the sea with the first floods of winter.

The development of the spawn and subsequent progress of the fry are not so well ascertained as the habits of the parent fish; but the probability is, that the fry—like those of most summer spawning fish—are very rapidly hatched, and increase their weight quickly at first, as otherwise they could never hold their own against the attacks of the innumerable enemies to which they are subjected in their early helpless stages. The fry of several species remain through the winter in the comparative security afforded by the sheltered waters of the river, leaving for sea at the end of the following autumn, and becoming marketable in the ensuing spring—two years after they are hatched.

Forty years ago, the bays near Hobart Town swarmed with fish during the summer months, and flounders and soles could be caught in any quantity on all the beaches at Sandy Bay. Vast shoals of Bream, Mullet, and Native Salmon, made their way up to the junction of the fresh and salt water at Herdsman's Cove, in the Jordan, and above New Norfolk in the Derwent, at both which places angling was for several years afterwards successfully carried on.

In the summer months, between the years 1840 and 1850, anyone standing on the rocks near Green Point might have seen myriads of large fish passing and repassing with each tide, in and out of the estuary of the Jordan, and Bream of two or three pounds each played in thousands about the shallows above Bridgewater, and at New Norfolk.

In those early days and for many years afterwards, all the fish required for the Hobart Town market were easily obtained in the neighbourhood, and comparatively few nets were worked, but as the town grew the demand became larger; the number of nets increased, they were worked night after night without any reference to season, or restrictions as to the sale—everything with fins was swept up, and the nearest bays denuded of their fish.

The nets used were seines of great length, with meshes generally less than an inch square; they were paid out from the stern of a boat in a large semicircle, and then hauled from both ends on to the shore. The fishing was carried on at night, when the bulk of the fish referred to were feeding in the shoal water, or depositing their spawn—in the latter case much of the spawn must have been totally destroyed, because the weeds upon which it was hung would choke the lower portion of the net, and weeds, spawn, and minute fry would alike be drawn on shore and left to perish.

As the bays which were fished near town became exhausted, the men began to follow the unfortunate spawning fish further and further up the river. Unprotected by any law, that which ought to have been regarded as a nursery, from which to supply the lower waters periodically with marketable fish, was more and more encroached upon, and as might have been expected, the fish grew scarcer and scarcer and smaller and smaller, till flounders two inches across, and mullet three inches long were to our national disgrace hawked about the streets. Line fishing above the town became a mockery, and those who remember the sport of other days gave it up in utter disgust.

Angling in the upper waters fared no better, and was partially abandoned, while half a dozen net fishermen continued doing their utmost to kill the goose, which, with proper care, ought to have provided them and their descendants with golden eggs for all time.

In the year 1864, it became necessary, in order to ensure the safety of the few dozen of salmon smolts then descending the Derwent, to put some restraint upon the excessive netting in the river, and the Salmon Commissioners availed themselves of the power given them under the Salmon Act, and recommended the suppression of all netting above the town. At the time, one or two men made a faint show of resistance to this measure, but did not press the subject probably because, having so far stripped the river, there was not much lost by the restriction.

The improvement consequent upon stopping the netting soon became apparent. Towards the end of the second season the hand-line fishing from boats near town improved considerably, and the fish have since steadily increased both in quantity and size. Angling has been resumed with great success in the lower waters, and is gaining in favor as a healthy and profitable recreation each year. Near the mouth of the Sorell Rivulet shoals of large bream have been constantly seen, where, a short time ago but few, and in some seasons, none showed themselves, One man who has fished the river for more than 30 years, and on whose veracity I can rely, assures me that he has seen a shoal of these fish covering half an acre, and that he believes the river will soon be what it was in its best days.

The bays about New Town and Risdon have been alive with fish during the last season, and anglers in those waters rarely failed to make good baskets.

This abundance of fish in the bays above the town has now excited the cupidity of those few net fishermen who do not consider anything beyond their present gain, and who for the sake of two or three good seasons would not only run the risk of wasting all the money and labour expended, for their own ultimate benefit, in the salmon experiment, but would even wantonly sacrifice the permanent interest of the public, and especially of the angling and line fishing public, by scraping up every spawning fish they can follow to the shallows, and thus undo all the good work which the Salmon Commissioners have done by placing some restriction on the netting.

These fishermen are now urging Parliament to re-open the river, and those who advocate this to do so mainly on two grounds, one the hardship to the fishermen by taking away their means of livelihood, the other the advantage to be gained by catching a veritable salmon, and proving beyond doubt the success of the experiment.

As to the first ground, it is difficult to understand why the presence of a larger number of fish in the upper waters makes the hardship any greater now than it was in 1864. On the contrary; the closing the river has each year tended to make the fishing in the lower waters better at those seasons in which the fish ought to be caught.

Had the net fishermen been allowed to go on as they had commenced, the river would soon have yielded them no profit at all, either in the upper or lower waters, a hardship much more serious than any they can now be subjected to by keeping the upper waters closed, as each winter will bring a fresh supply of marketable fish within reach of their nets.

It is also stated that in severe southerly weather the men must either go up the river or lie idle at great loss, but the upper waters are only worth netting in summer and autumn, when southerly gales are rare. The men who are really the sufferers by heavy southerly weather, are not the seine net men, but the deep-sea fishermen, who have to get from 20 to 60 miles out on to the exposed coast.

It is a rather significant fact that since the closing of the river, deep-sea well-boats of superior build have increased in number, and, with the single exception of flounders, the better fish have been brought to market in such numbers that real trumpeter are now cheaper than when the river was open, although quantities are occasionally sent to Melbourne.

It is quite probable that if the upper waters were thrown open during the next two seasons, there would be for a time such a supply that the market of the deep-sea fish might be materially affected, and some of the boats withdrawn from an industry which deserves every encouragement—in other words, we should sacrifice a legitimate trade for that which ought to be considered illegitimate.

Even if some hardships could be shown to exist, surely the future interests of the whole public are not to be sacrificed for the immediate and short lived benefit of some two dozen men, for it must be remembered that in the port of Hobart Town, the whole of the boats and gear fitted for this destructive fishing, are the property of two individuals, and that the hands employed in it rarely exceed 20 at any one time. The injury inflicted upon these 20 men and their families, by the closing of the river, can only be estimated at the difference between the wages they used to earn at the fishing in 1864, when it was failing perceptibly, and what they can now earn at any other occupation, and that difference must be trifling.

As to the second ground upon which the opening of the river is advocated, it is by no means certain that allowing the nets to be worked for a few miles up the river would lead to the capture of salmon, for there can at present only be a few mature fish scattered over a wide expanse of water, and no net really adapted for salmon fishing in the wide tidal waters, with a mesh eight inches round when wet, it is to be found in the colony, and if it could be found it would not suit the purpose of those fishermen, who, caring little for the success or failure of the salmon experiment, simply wish to scrape out everything saleable, and would never be satisfied to use a mesh through which a fair sized smolt could pass.

Again, it is quite possible that the space travelled over by the salmon in their migration seaward may depend much upon their supply of food, and that, while the fish are scarce and their food abundant, they will not travel far from the junction of the fresh and salt water.

Granting that salmon might be caught by opening the river and using proper nets, is it not manifest that the rapid stocking of our rivers would be more seriously retarded by killing half-a-dozen salmon now, when only a few pairs reach the spawning beds, than by killing as many thousands a few years hence, when every gravelly rapid over hundreds of acres will be tenanted by spawning fish?

# NOTES ON THE OCCURRENCE OF GOLD AT PORT CYGNET.

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### By T. Stephens, M.A.

A visit recently paid to Port Cygnet has resulted in a discovery which is not without interest from a scientific point of view, if nothing more. Having had to traverse the Huon district in all directions for several years past, in the discharge of official duties, I had become tolerably familiar with its principal geological features, which present few variations from those that prevail in the neighbourhood of Hobart Town, and the greater part of the Derwent basin. If a line be drawn from the East Coast through Campbell Town to the Great Lake, and thence southwards to Recherche Bay in a direction nearly corresponding with the course of the 147th meridian, the area included between this and the coastline is the only large section of Tasmania in which there is no ground for expecting discoveries of gold or other valuable metals. The sedimentary rocks of the whole of this area may be described in general terms as Upper Palæozoic. They comprise the carboniferous series, and probably pass upwards into the counterparts of rocks now established in Victoria as Mesozoic, and they are here and there overlaid by Tertiary and Post-tertiary deposits. The whole series, to the Tertiary inclusive, has been penetrated and intersected to an extraordinary extent by trappean and basaltic rocks, which frequently hide the sedimentary strata altogether from view over extensive tracts of country.

But none of the older rocks, the recognised source of gold wherever it has been found in paying quantities, have hitherto been known to exist within this area, and as the greater part of it has been pretty well explored by the geologist, it is only in an odd corner, here and there, that their presence comes within the range of possibility. The oft repeated announcement of the discovery ot gold in small quantities at Port Cygnet, added to a previous acquaintance with the indications of extensive denudation of the upper Palæozoic sandstones and mudstones in that neighbourhood, suggested to me the idea of paying closer attention to the spots where any of the primary rocks, which by any chance had been elevated above the sea level, might be expected to show themselves. And after a brief examination of the rock exposed in a quarry near the southern extremity of the township, and in a small tributary of the Agnes Rivulet, I have little hesitation in pronouncing it to be of earlier date than any which has hitherto been recognised in the above-mentioned area. It varies in character from a soft arenaceous clay slate to a hard compact grit, containing in places rolled pebbles and boulders of schistose or metamorphic rocks, with porphyries and granite, and is in all respects analogous to portions of the old conglomerates of the North Coast, which are undoubtedly of Silurian age. It occurs on both sides of the Agnes Rivulet, which seems to occupy a synclinal hollow, and it is evidently unconformable to the Upper Palæozoic mudstones by whose denudation it has been exposed. The ruling angle of dip is about 60°, the strike being nearly north and south. The rock is in places highly impregnated with iron pyrites, and I noticed faint impressions, apparently of organic origin, but too indistinct to be made out on the spot, and the matrix too perishable to allow of its removal for examination. Until some fossils have been discovered and identified, all further speculations as to geological age are quite futile, but the search for them I must leave to those who have plenty of leisure time.

The existence in this neighbourhood of an interesting porphyritic rock, containing large crystals of felspar, has long been known. Though peculiar to the district it is analogous in several respects to many common members of the trappean series, but the entire absence of hornblende, which in them is a distinguishing feature, is noticeable. It is clearly newer than the grit just described, which it intersects in the form of a vast dyke on the western side of the township, another branch showing itself in a quarry near the new slab road; and it seems probable that the quartzose veinstones, which have been quite recently met with, and which appear to traverse the porphyry near some of its points of contact with the older rocks, are the source of the gold which has been sparingly found in the alluvium of adjacent gullies. Whether a careful assay of specimens from these veinstones will result in the establishment of this theory remains yet to be proved. Unfortunately the most interesting part of the quarry last referred to, is now under water, and there is no other spot in the neighbourhood which affords similar facilities for investigating the subject. There are well authenticated instances in Victoria of the occurrence of auriferous veins of similar character in diorites closely allied by their geological relations to the porphyry of Port Cygnet, but I see no grounds at present for advising any large outlay in the search for gold. It is clear that in the shallow alluvium, where it has hitherto been found, there is no prospect of an adequate return for the expenditure of labour and capital, and it is equally clear that the deep ground, where there is only a remote probability of the existence of an auriferous lead, could not be worked except at very great expense. Again, the quartzose veins of the porphyry have not yet been seen developed in any practicable shape. Attention has however been directed to the subject, and it is by no means improbable that continuations of these veins will some day be traced into the more substantial forms by which, under similar geological conditions, they are elsewhere represented.

# THE PHYLLACTIDIUM PULCHELLUM.

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By E. D. Harrop, F.R.M.S.

| | | |
|---|---|---|
| Phyllactidium Pulchellum ... | Kutzing. | Gray. |
| Coleochæte Scutata ............ | Brébison. | Hassall. |

It may be well to place on record the fact that this beautiful microscopic plant has been noticed in Tasmania; and as so little is known of it even amongst microscopists, I will, at the same time, with the permission of the Fellows of the Society, describe it, and give a few lines on its history.

The first occasion on which it was observed here was last year by Mr. Sale, of Launceston, by whom it was found adhering to the glass sides of his aquarium, and since then I have discovered it in its natural habitat, namely, the leaves and stems of water plants. I send prepared specimens for examination by the Fellows.

Although this plant was discovered in England in 1844 by Mr. Ralfs, who published a paper describing it in the "Annals of Natural History" in 1845; yet so seldom had it been noticed by Algologists, that Dr. Gray, F.R.S., described it in "Seeman's Journal of Botany," in 1866, as new to Great Britain. Kutzing appears to have been its first discoverer in 1838, when he met with it growing in an aquarium. Brébison also observed it in 1844 at Falaise, growing on the leaves and stems of inundated and in part decomposed water plants, principally on the Sparganium natans and Potamogeton natans. He named it the Coleochæte Scutata, and from the setigerous sheaths, growing sometimes numerously from the upper portion of the cells, considered that it should be placed in the Chætophoroidæ, and near the Bulbochæte. The generic and specific names of Phyllactidium pulchellum first given it by Kutzing, and confirmed by Gray, are those by which it is now known.

From the fact that this plant has generally been found associated with, or rather in water in which the Volvox Globator has been abundant, it was presumed by some observers that there was some connection between the plants; but its affinities are with quite another family of the Confervoideæ, namely, the Chætophoraceæ.

From most, if not all, of these plants there grows on the back of some of the cells a sheath having a bulbous base, and from out of which apparently issues a delicate setaceous filament of considerable length. These setæ are not always met with, and I should say are rarely seen in mounted specimens, as they are extremely caducous. It is these setaceous filaments which place this remarkable plant in the family Chætophoraceæ of the Confervoid Algæ, and at the same time would appear to ally it to the Bulbochæte, with which genus Hassall considers it has close affinities.

On the specimens on Slide No. 2, which were taken from the stem of a water plant, there will be noticed on the back of the cells nearer the margin than the centre, several masses of Eudochrome. These are the Sporangia. The reproduction of the plant is said to be effected by zoospores as well as spores, the zoospores being produced singly from the cell contents and bearing two cilia. With plants so minute, observation in respect of the reproduction by zoospores is extremely difficult, and it is but rarely, indeed, that such points can be noted,and only when one is so fortunate as to have a specimen under examination in which the zoospores are on the point of escaping from the cells. This is quite possible when the plant grows in an aquarium, through the sides of which it may be observed with a glass from day to day.

Dr. Gray describes the organism as follows :—" The form is discoidal, circular, slightly concave on one side, formed of very minute, nearly equal sized square cells, placed on forked lines regularly spreading from a central cell to the circumference; the frond is thin, membranaceous, and the upper and under surfaces are similar. The fructification consists of from twelve to sixteen square thickened patches, forming a circle (sometimes two) rather nearer the margin than the centre of the disc, the square patches being often placed in pairs. The fructification was first observed by Suringar in his thesis entitled " Observationes Physiologicæ," delivered in Leyden, 3rd March, 1857."

This description fails to include the setigerous sheaths, which is an important omission, being that part of its organisation above others which has enabled botanists to give the genus its natural position.

The sheath and filament are well shown on a specimen in preparation No. 2, where the delicate filament will be seen to issue from the setigerous sheath for a length almost equal to the diameter of the frond; and in both of the preparations (Nos. 2 and 3) of the plant taken from the natural habitat there can be seen, with a little management of the light, numerous sheaths. Specimen No. 1 grew on the glass side of an aquarium, and it will be noticed how much finer the frond is than in those taken from the stems of water plants, so much so that one might be led to consider it a variety. I think it is a perfectly mature frond as regards size, as the plants disappeared from the aquarium shortly after it was collected. The plant may, moreover, develope better on the smooth glass than on the rougher stems of water plants; in fact, it is just one of those conditions that might fairly be supposed to give rise to a variety.

# METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE SPRING QUARTER, 1869.

| Months. | Mean in Shade. | | | | Solar Intensity Black Bulb Insulated. | Terrestrial Radiation on Grass. | Wind. | | Rain. | | Evaporation exposed to open Sky. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pressure.—Barometer corrected to 32°. | Temperature of Air. | Maximum of Air. | Minimum of Air. | | | Prevailing Currents. | Force. | No. of Days. | Amount collected. | |
| | Inches. | ° | ° | ° | ° | ° | | lbs. | | In. | In. |
| Sept. .. | 29·947 | 52·81 | 75 | 31 | 93·77 | 39·75 | N.W., S.E. | 62·71 | 9 | 0·98 | 3·52 |
| Oct. .. | 29·766 | 57·58 | 73 | 40 | 102·47 | 45·13 | N.W., S.E. | 46·29 | 15 | 3·32 | 2.82 |
| Nov. .. | 29·706 | 59·51 | 78 | 40 | 102·13 | 45·63 | N.W., S.E. | 52·01 | 14 | 1·87 | 4·22 |
| Mean.. | 29·815 | 56·63 | 75·3 | 37·0 | 99·45 | 43·50 | N.W., S.E. | 53·67 | 38 | 6·17 | 10·56 |

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

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## *Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Spring Quarter,* 1869.

September 8th.—Common Ash commencing to break into leaf.
,, 12th.—Grape Vines commencing to start.
,, 15th.—Common Oak commencing to break into leaf.
,, 16th.—Moutan Peony commencing to flower.
,, 22nd.—Horse Chestnut ditto ditto.
,, 25th.—Robinia Pseudo-acacia commencing to break into leaf.
October 5th.—Carpinus Betulus commencing to break into leaf.
,, 12th.—Ailanthus Glandulosus ditto ditto.
,, 16th.—Common Lime ditto ditto.
,, 17th.—Black Mulberry ditto ditto.
,, 20th.—Elm Seeds commencing to fall.
,, 26th.—Melia Azederach commencing to break.
November 5th.—First Strawberry (Marguerite) gathered.
,, 10th.—First Cherry (May Duke) gathered.
,, 14th.—Black Mulberry in full flower.
,, 20th.—Pomegranate in flower.
,, 21st.—First Raspberry gathered.
,, 28th.—Bougainvillea Spectabilis in full flower.

NOTE.—Strawberries were four, Cherries six, Black Mulberry seven, and Pomegranate six days later this year than last; the time of the remainder of the above plants being about the same as last year.

# METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE SUMMER QUARTER, 1869-70.

| Months. | Mean in Shade. | | | | Solar Intensity Black Bulb Insulated. | Terrestrial Radiation on Grass. | Wind. | | Rain. | | Evaporation exposed to open Sky. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pressure. — Barometer corrected to 32°. | Temperature of Air. | Maximum of Air. | Minimum of Air. | | | Prevailing Currents. | Force. | No. of Days. | Amount collected. | |
| | Inches. | ° | ° | ° | ° | ° | | lbs. | | In. | In. |
| Dec. .. | 29·739 | 61·55 | 84 | 40 | 107·23 | 38·0 | N.W., S.E. | 78·83 | 15 | 1·47 | 5·80 |
| Jan. .. | 29·758 | 66·62 | 99 | 45 | 107·60 | 42·5 | N.W., S.E. | 92·63 | 9 | 4·57 | 5.00 |
| Feb. .. | 29·928 | 63·45 | 92 | 42 | 107·36 | 39·0 | N.W., S.E. | 60·88 | 5 | 0·35 | 5·32 |
| Mean.. | 29·805 | 63·87 | 91·6 | 42·3 | 107·39 | 39·83 | NW., SE. | 77·44 | 26 | 6·39 | 16·12 |

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

FRANCIS ABBOTT, Private Observatory.

## *Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Summer Quarter,* 1869.

December 10th.—First Red Currant ripe.
" 11th.—Common Privet commencing to flower.
" 14th.—Black Currants commencing to ripen.
" 15th.—Melia azederach commencing to flower.
" 16th.—Doyenne d'Ete Pear commencing to ripen.
" 20th.—Juneating Apple ditto ditto.
January 1st.—First Apricot (Royal) gathered.
" 8th.—Grevillea robusta in full flower.
" 9th.—Jargonelle Pear ripe.
" 12th.—Mulberries commencing to ripen.
" 14th.—Veronica angustifolia in full flower.
February 1st.—Kerry Pippin Apple commencing to ripen.
" 2nd.—Windsor Pear ditto ditto.
" 6th.—Greengage Plum ditto ditto.
" 15th.—Common Ash commencing to shed seed.
" 18th—Sycamore ditto ditto

NOTE.—Red Currants were six days, Privet six days, Black Currants six days, Melia azederach three days, Doyenne d'Ete Pear two days, Juneating Apple five days, Apricot nine days, and Grevillea two days *later* than last season; and Kerry Pippin Apple was three days, Windsor Pear four days, Ash three days, and Sycamore four days *earlier*. The remainder were about the same time as last year.

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# REPORT

OF THE

# ROYAL SOCIETY

OF

# TASMANIA

FOR THE YEAR

## 1869.

A TASMANIA:
PRINTED AT THE "MERCURY" STEAM PRESS OFFICE, HOBART TOWN.
1870.

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## MINUTES of the ANNUAL GENERAL MEETING of the ROYAL SOCIETY OF TASMANIA, held at the Museum, Macquarie-street, at 7 o'clock p.m., on the 28th January, 1870: T. Giblin, Esq., in the chair.

The following gentlemen, who had been previously nominated by the Council, were, after a ballot, duly elected as Fellows of the Society:—Rev. H. D. Atkinson and Horatio Nelson, Esq.

The CHAIRMAN having read the advertisement by which the meeting had been convened, called upon the Secretary to read the report.

The Report for 1869 was then read.

It was moved by Mr. STEPHENS, seconded by Mr. ABBOTT, and carried, "That the Report be adopted and printed for circulation amongst the Fellows."

Mr. J. W. GRAVES moved a vote of thanks to Dr. Agnew for the very careful and elaborate Report he had drawn up, and he supported the motion by some eulogistic remarks on the services rendered by the Hon. Secretary.

Mr. F. ABBOTT seconded, and the motion was unanimously agreed to.

Dr. AGNEW acknowledged the compliment and said he needed no thanks for what he had done; he should at all times be ready to exert himself to further the interests of the Society. He referred to the testimonial which the last annual meeting requested him to procure, and reported that when he was in Melbourne, he endeavoured to select something to the value of the sum subscribed. The testimonial which he procured had been submitted for the inspection of the Fellows, and had, he believed, given general satisfaction to the subscribers.

The meeting proceeded to fill up the four vacancies caused by the retiring members of the Council, Messrs. Justin McC. Browne and A. G. Webster being appointed scrutineers.

The following gentlemen were re-elected:—

VEN. ARCHDEACON DAVIES
HON. A. KENNERLEY, ESQ.
M. ALLPORT, ESQ.
J. W. AGNEW, ESQ., M.D.

On the motion of Mr. BARNARD, seconded by Mr. WEBSTER, Messrs. F. Butler and H. Cook, were re-elected Auditors of annual accounts.

A vote of thanks having been passed to the Chairman, Mr. GIBLIN expressed his acknowledgments, and regretted that the meeting had not been favoured with the attendance of the President, or some Vice-President, as he was of opinion that on these annual occasions there ought to be an address from the chair to the members, as was the case elsewhere.

The meeting then terminated.

⁂

# REPORT.

The Session of 1869 was opened on the 9th March, with a paper by F. Abbott, Esq., F.R.A.S., on the late "Transit of Mercury over the Sun's Disc," and the following papers were read at the monthly meetings during the year:—"Remarks on the Geological Structure of Part of the North Coast of Tasmania, with special reference to the Tertiary Marine Beds near Table Cape," by T. Stephens, M.A.; "On the Manufacture of Beet Sugar in New South Wales," by James Barnard, Esq.; "Nobert's test-plate, Moller's Diatom type slide, and Modern Microscopes," by F. Abbott, Esq., F.R.A.S., F.R.M.S. "Net fishing in the River Derwent," by M. Allport, Esq., F.L.S., F.Z.S. "Notes on the occurrence of gold at Port Cygnet," by T. Stephens, Esq., M.A.

Communications to the Secretary, by E. D. Harrop, Esq., F.R.M.S., of Launceston, on the development of the Fasciola hepatica (Sheep Fluke) and on the Phylactidium pulchellum (one of the confervoid Algæ) were also read by permission of the Council.

The Annual Microscopical Soirée was held on the last evening of the Session, and as the Fellows had the privilege of introducing ladies, a very large number of visitors attended, who were both pleased and interested in the examination of the numerous objects collected for their inspection.

The monthly Meteorological Tables have been regularly published, and copies of them forwarded to the Government observatories at Melbourne, Sydney, Adelaide, Brisbane, Perth, Western Australia, and Wellington, New Zealand, from all of which places we receive similar returns.

The published papers of the Society have been as usual forwarded to various scientific Societies and individuals in England, America. the neighbouring Colonies and elsewhere, for which liberal returns have been received, especially from America, both from the Government and from the Smithsonian Institution.

## COUNCIL.

No vacancy has occurred during the year. The required list according to Rule XXXII., as amended at the General Meeting of 1868, has been exhibited in the Library for the last fortnight.

## FINANCE.

In last year's Report the unexpected reduction of the grant-in-aid was referred to. The necessary consequence of this withdrawal of £50 annually has been the contraction of a debt, as it has not been found possible to carry out stricter economy than has hitherto been exercised. We are happy to say our income from subscriptions and arrears contrasts favorably with that of last year, and as Government (in response to an urgent appeal from the Council) has restored the £50 to our grant, we expect to see the debt very considerably reduced at the end of the current year.

Although the Museum grant has been augmented by £50, we are sorry to say the like sum has been deducted from the Garden grant. This is now only £400; a sum for which it is evident these extensive Gardens cannot be attended to in a manner satisfactory to anyone who takes the slightest interest in their proper maintenance.

Our total income (viz., Government Grant, £150 to Museum, £450 to Gardens; subscriptions £150, and sale of plants, &c., £83 11s. 6d.) has been £833 11s. 6d.; which, with £30 12s. in the hands of the Superintendent of the Gardens for payment of current expenses, and about £40 still due for subscriptions, will give a total of £904 3s. 6d. The total expenditure and liabilities amount to £965 1s., leaving to our debit a balance of £60 17s. 6d.

As will be seen by the Balance Sheet, the debt referred to consists chiefly of accounts due to the London Agents. Of these Messrs. Wheatley's is the usual annual account for current literature; the other is an old-standing account of Messrs. Orger and Meryon, of which we are happy to say one moiety has been cleared off during the last two years, leaving at present only £29 5s. 2d. unpaid.

It is only fair to mention that the expenditure for the year (without considering previous liabilities) has been kept within the income, as will be seen by the following figures:—

| | £ | s. | d. |
|---|---|---|---|
| Total Receipts from all sources | 833 | 11 | 6 |
| Total Expenditure ... ... ... | 830 | 9 | 7 |
| Balance ... ... | £3 | 1 | 11 |

## GARDENS.

About 400 new plants have been introduced during the past year, embracing many of great interest or utility; as *Rhamnus utilis*, from which is prepared the green dye of China; *Carya tomentosa*, White Hickory or Mocker Nut; *Carya oliviformis*, Pecan Nut; *Thea Assamica*, Assam Tea;

*Dactylis cæspitosa*, Tussac Grass of Falkland Islands; *Fraxinus pendula aurea*, the Golden Weeping Ash; *Jacaranda mimosæfolia*, and *Jacaranda mimosæfolia alba; Dahlia imperialis*, the tree Dahlia which grows to the height of ten or more feet, and is said to be very beautiful when in flower, and *Retinospora ericoides*, from Japan.

Several of the Coniferæ have produced seed for the first time in the colony, during the year. The following are perhaps worthy of especial notice:—*Wellingtonia gigantea*, the mammoth tree of California; *Abies Webbiana*, the purple coned Fir; *Thuja Lobbi; Juniperus Langoldiana; Pinus muricata*, *pyreniaca*, *Monspeliensis*, and *Montezumæ.*

About an acre of ground has been trenched, and it is purposed to have it thrown open to the public during the ensuing autumn.

Estimated number of visitors for the year, 22,033.

## MUSEUM.

Additions have been made to the Conchological collection from various parts of Tasmania, especially the East Coast. To Dr. J. Cox, of Sydney, we are also much indebted for valuable contributions. For the proper display of these and other specimens, which are continually increasing in number, additional case room is much required.

For the exhibition of our stores of wet preparations a considerable outlay (to which our funds are at present unequal) for glass jars and spirits would be necessary.

Specimens of our Fauna, for exchange, have been sent to the Museums of Magdalen College, Cambridge, and Kentucky. Offers of exchange have also been received from some of the Continental (European) collections. It is only due to our former Secretary, Dr. Milligan, to refer to the valuable collection of Tasmanian plants presented by him, arranged and scientifically named by Dr. Hooker, of Kew.

As will be seen by the list of donations many additions have been made to the Geological Museum, all of which have been arranged in their appropriate sections; and the general collection has also received many specimens of Birds, Reptiles, Fishes, &c., with other objects of interest. Several skeletons of indigenous animals have been prepared, and will shortly be articulated and mounted for exhibition.

The Museum has been visited by 12,960 persons during the year. This number is almost double that of any previous year—a circumstance to be attributed in a great degree to the interest excited by the exhibition of the salmon smolts caught in October and December last.

## *STATEMENT of the Funds of the ROYAL SOCIETY for the Year* 1869.

| RECEIPTS. | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Annual Subscriptions from 69 Members .. .. .. .. | 103 | 10 | 0 | | | |
| Arrears of ditto .. .. .. .. .. .. .. .. | 46 | 10 | 0 | | | |
| Total Royal Society .. .. .. .. .. .. | | | | 150 | 0 | 0 |
| MUSEUM—Grant-in-aid from Treasury .. .. .. .. | 150 | 0 | 0 | | | |
| Total Museum .. .. .. .. .. .. .. | | | | 150 | 0 | 0 |
| BOTANIC GARDENS—Proceeds of Sale of Plants, Fruit, &c. | 83 | 11 | 6 | | | |
| Grant-in-aid from Treasury .. .. .. .. .. | 450 | 0 | 0 | | | |
| Total Botanic Gardens .. .. .. .. | | | | 533 | 11 | 6 |
| 14th Jan., 1870.—Balance overdrawn at Commercial Bank | | | | 82 | 4 | 4 |
| | | | | £915 | 15 | 10 |
| *Note*.—Dr.—To overdrawn Balance at Bank .. .. | 82 | 4 | 4 | | | |
| Balance of account due to Messrs. Orger & Meryon, London .. .. .. .. .. .. .. .. | 29 | 5 | 2 | | | |
| Messrs. Wheatley & Co. account to 31st December (not received), estimated at .. .. .. .. .. | 20 | 0 | 0 | | | |
| Total .. .. .. .. .. | | | | 131 | 9 | 6 |
| Cr.—By Cash in hands of Superintendent, Botanic Gardens .. .. .. .. .. .. .. .. | 30 | 12 | 0 | | | |
| Subscriptions due .. .. .. .. .. .. .. | 40 | 0 | 0 | | | |
| Total .. .. .. .. | | | | 70 | 12 | 0 |
| Balance to Debit .. .. .. .. .. .. | | | | £60 | 17 | 6 |

| EXPENDITURE. | £ | s. | d. | £ | s | d. |
|---|---|---|---|---|---|---|
| Balance overdrawn at Commercial Bank, as per statement for 1868 .. .. .. .. .. .. .. .. | | | | 85 | 6 | 3 |
| Interest on overdrawn account 1869, as per Bank Book | | | | 6 | 8 | 7 |
| ROYAL SOCIETY—Meteorological Instruments .. .. | 2 | 0 | 0 | | | |
| Printing, Advertising, &c. .. .. .. .. .. .. | 32 | 11 | 11 | | | |
| Postage, Parcels, &c. .. .. .. .. .. .. .. | 3 | 5 | 1 | | | |
| Collector's Commission, on Subscriptions received, £150 at 5 per cent. .. .. .. .. .. .. .. | 7 | 10 | 0 | | | |
| Messenger for delivering Papers and Proceedings .. | 1 | 0 | 0 | | | |
| Library—Books and Stationery .. .. .. .. | 47 | 7 | 3 | | | |
| Total Royal Society .. .. .. .. .. | | | | 93 | 14 | 3 |
| MUSEUM—Salary of Curator .. .. .. .. .. | 125 | 0 | 0 | | | |
| Wages of Attendant .. .. .. .. .. .. | 52 | 0 | 0 | | | |
| Premium of Insurance .. .. .. .. .. .. | 6 | 7 | 6 | | | |
| Purchase of, and preparing Specimens .. .. .. | 2 | 12 | 6 | | | |
| Water Rate .. .. .. .. .. .. .. .. | 3 | 3 | 0 | | | |
| Fuel and Light .. .. .. .. .. .. .. | 3 | 9 | 7 | | | |
| Sundries and Petty Cash .. .. .. .. .. | 1 | 0 | 3 | | | |
| Camphor, Spirits of Wine, &c. .. .. .. .. | 8 | 11 | 9 | | | |
| Freight and Carriage of Specimens .. .. .. .. | 0 | 14 | 6 | | | |
| Fittings, Repairs, &c. .. .. .. .. .. .. | 5 | 1 | 1 | | | |
| Ironmongery, &c. .. .. .. .. .. .. .. | 2 | 14 | 8 | | | |
| Total Museum .. .. .. .. .. | | | | 210 | 14 | 10 |
| BOTANIC GARDENS—Salary of Superintendent .. .. | 150 | 0 | 0 | | | |
| Wages of Foreman and Labourers .. .. .. .. | 275 | 19 | 0 | | | |
| Tools and Repair of ditto .. .. .. .. .. | 6 | 14 | 1½ | | | |
| Freight and Carriage of Plants .. .. .. .. | 6 | 2 | 3 | | | |
| Stationery and Postage .. .. .. .. .. .. | 2 | 7 | 2 | | | |
| Forage .. .. .. .. .. .. .. .. .. | 22 | 10 | 0 | | | |
| Ironmongery, &c. .. .. .. .. .. .. .. | 21 | 2 | 1 | | | |
| Flower Pots .. .. .. .. .. .. .. .. | 7 | 5 | 0 | | | |
| Sundries .. .. .. .. .. .. .. .. .. | 24 | 1 | 8½ | | | |
| Repairs to Buildings .. .. .. .. .. .. | 2 | 0 | 3 | | | |
| Seeds .. .. .. .. .. .. .. .. .. | 1 | 10 | 4 | | | |
| Total Botanic Gardens .. .. .. .. | | | | 519 | 11 | 11 |
| | | | | £915 | 15 | 10 |

Audited and found correct, February 23rd, 1870,
FRANCIS BUTLER, } *Auditors.*
HENRY COOK, }

## BOOKS PURCHASED & PRESENTED DURING 1869.

[*Presentations marked thus.**]

Anthropological Society, Memoirs of, Vols. 1 and 2.
*———, Works published by, in 1864-5, 4 Vols.
*———, Catalogue of Books in Library of, 1869.
*———, List of Fellows, 1867.
*Anthropological Review. Nos. 2 to 22. From the Society.
*———Astronomical Register, Nos. 69 to 79. From F. Abbott, Esq.
*———Observations made at Williamstown, Victoria, in 1861-2-3. From Victorian Government.
*Acid, Hydrofluoric, on, by G. Gore, F.R.S. From the author.
Athenæum, The, Parts, 490 to 501, October 1868, to September, 1869.
Arts, Journal of Society of, Vol. 16, Nos. 833 to 844, Vol. 17, Nos. 845 to 884. November 6th, 1868, to October 29th, 1869.
Arts, Transactions of Society of, Vol. 16, bound, 1867-8.
*Association, British, Report of, 1867, bound.
*Agricultural Society of New South Wales, Journal of, Vol. 1, Nos. 6 to 12; Vol. 2, Nos. 1 to 4. From the Society.
*Builder, The, Nos. 212 to 225. August, 1868, to September, 1869.
*Boundary Line of New South Wales and South Australia, Determination of. By C. Todd, Esq. From the author.
Botanical Works of the late Robert Brown. Vols. 2 and 3.
*Botanical Discoveries in Australia. Pamphlet by W. Woolls, F.L.S. From Mr. S. H. Wintle.
*Beet Sugar, Manufacture of. MS. By J. Barnard, Esq. From the author.
Conchologia Iconica. Parts 274 and 275 to 280 and 281.
*Colonial Publications, viz., " Derwent Star," 1810; six Government orders, 1814; promissory note, value 3d., 1824. From F. A. Moore, Esq., Mangalore, Bridgewater.
*Catalogue of Surgical Section, United States Army, Medical Museum. From Government of United States.
*Exhibition, Intercolonial, 1869 (Sydney), Catalogue of. From J. Barnard, Esq.
*Electrograph Pendulum, Description of. By L. R. J, Ellery, Esq., Melbourne Observatory. From the author.
Florist and Pomologist, Nos. 11 to 22. November, 1868, to October, 1869.
*Flora Capensis, Vols. 1, 2 and 3. From Dr. Sonder, Hamburg.
*Fossilen Mollusken. by Dr. M. Hornes. From ditto.
*Fluke Sheep, The, on development of, by E. D. Harrop, Esq., F.R.M.S. From the author.
Gardeners' Chronicle, Nos. 45 to 52, November 7th to December 20th, 1868; Nos. 1 to 44, January 2nd to October 30th, 1869.
*Geological Structure of part of North Coast of Tasmania, By T. Stephens, Esq., M.A. From the author.
*Gold, on the occurrence of, at Port Cygnet. By the same. From the author.
*Intelligencer, Walch's Literary, monthly.
Journal, Practical Mechanics. Parts 44 to 55, November, 1868 to October, 1869.
*Journals of House of Assembly, Tasmania, Vols. 5, 8, 12, and 16. From Government.
*——— of Legislative Council, Vol. 4. From ditto.
Journal, Quarterly of Science, Nos. 21 to 24, January to August, 1869.
Journal of Science, Silliman's American, Vol. 46, No. 138, to Vol. 49, No. 143,
*Law, Reign of, Argyle's. From Dr. Milligan.
Magazine, Country Gentleman's, Vol. 1, No. 5 to 9; Vol. 2, Nos. 10 to 12. Vol. 3 Nos. 13 to 16, November, 1868, to October, 1869.
*Mining Surveyors and Registrars, Victoria, Report of 31st December, 1868. From Government of Victoria.
Magazine of Science and Art (Sydney), Vol. 2, 1859.

*Meteorological Observations made at Hobart Town by F. Abbott, Esq., F.R.M.S., &c. Monthly Tables for 1869.

*————————Port Arthur, from J. Boyd, Esq., ditto, ditto, ditto.

*————————Swansea, from Dr. Story, ditto, ditto.

*————————Westbury, from C. Belstead, Esq., ditto, ditto.

*———————— from King's, Island, Swan Island, Goose Island, Kent's Group, Mount Nelson, and South Bruni. From the Hobart Town Marine Board.

*Meteorological Observations, New Zealand, printed tables January to October, 1866: Report 1868; Observations 1868. From Government of New Zealand.

————————, Brisbane, January to July 1869, monthly tables; Summary for 1868. From Government of Queensland.

————————, Perth, Western Australia, ditto June to October, 1869. From W. J. Knight, Esq.

————————, New South Wales, ditto, January to December, 1866

————————————, Printed tables 1865-6. From Government Observatory.

*————————, Melbourne, ditto April to December, 1869, From Government Observatory.

*————————, Adelaide, ditto for December, 1868.

Natural History, Annals and Magazine of, Vol. 2, Nos. 11 and 12; Vol. 3, Nos. 13 to 18; Vol. 4, Nos. 19 to 22.

Naturgeschichte, Archiv fur. No. 6, 1866: Nos. 4 and 5, 1867.

*New Zealand, Abstract Report of Geological Survey of, 1868–9. From N.Z. Government.

*Nobert's Test Plate, &c., by F. Abbott, Esq., F.R.A.S., F.R.M.S. From the author.

*Net Fishing in the River Derwent, by M. Allport, Esq., F.L.S., F.Z.S. From the author.

*Proceedings of Royal Society, London, Vol 16, Nos. 95 to 104; Vol. 17. Nos. 105 to 113; Vol. 18, No. 114. From the Society.

*———— Royal Institution of Great Britain, Vol. 5, Part 1, No. 45, Part 2, No. 46.

*———— Essex Institute, Salem, Massachusetts, U.S.A., Vol. 4; and parts 1 and 2, Vol. 5.—Naturalists' Directory, No. 1.

*American Philosophical Society, Philadelphia, Vol. 10, No. 76.

*———— American Academy of Arts and Sciences, Boston, U.S., Vol. 6.

*Phylactidium pulchellum—On growth and development of, by E. D. Harrop, Esq., F.R.M.S.

*Report of Mining Surveyors, &c., Victoria, to 30th September, 1869. From Victorian Government.

*———of Registrar General, Victoria, December 1868 and March 1869. From ditto.

*———, Annual, of Secretary of War, Washington, United States, 1866.

———On Epidemic Cholera, being Circular No. 6 of Surgeon General's Office, Washington, U.S.

———, Inaugural, of Cincinatti Observatory, June 1868.

——— of Leeds Literary and Philosophical Society, 1868–1869.

———, 7th Annual, of Inspectors of Salmon Fisheries, England and Wales. From J. A. Youl, Esq.

Student, The, Nos. 10 to 21, Nov. 1868, to Nov. 1868.

*Society, Royal Geographical, London, Proceedings of, Vol. 12, Nos 2 to 5; Vol. 13, No 1, and slips of meetings.

———————— Journal of, Vol. 37, 1867.

*Society, Linnean, Journal of, Vol 9, No. 40; Vol. 10, Nos. 41 to 45, (Zoology) Vol. 9, No. 44; Vol. 10, Nos. 45 to 48,—Vol. 11, No. 49, (Botany).—From the Society.

————, Geological London, Quarterly Journal of, Vol. 24, Parts 2, 3, and 4, Nos. 94 to 96; Vol. 25, Pt. 1, Nos. 97, 48. From the Society.

————————List of, 1868.

*———, Royal Asiatic, Journal of, Vol. 3, Parts 1 and 2. From the Society.

*Society, Zoological, of London, Proceedings of, Parts 2 and 3, May to December, 1867, March to June, 1868.
*——, ———, Index to Proceedings, 1848 to 1860.
*——, ———, Report of, 1868.
*——, Boston (United States), of Natural History, Vols. 7 and 10, Vol. 11, Nos. 1 to 6.
*—— ———, Memoirs of, Vol. 1, Parts 1 and 2.
*——, Royal, of N. S. Wales, Transactions of, Vol. 1.
*Statistics of New Zealand, 1867 and 1868. From N. Z. Government.
*——— of Victoria for 1867 and 1868; general index to ditto. From Victorian Government.
*Survey, Geological, of Victoria, Maps, 1 vol. From Sir Robert Officer.
*Smithsonian Institution, Washington, United States, Report for 1865. From the Institution.
*——— Contributions to Knowledge, Vols. 6 and 7. From the same.
*Tasmanian Industries—Pamphlet by J. E. Calder, Esq. From the Government.
*Transits of Venus in 1774 and 1882, Observations on. By G. B. Airey, Esq., Astronomer Royal. From the author.
*Transactions of New Zealand Institute, 1868. From the Institute of Institution of Engineers in Scotland, Vols. 1 to 12 (1857 to 1868.) From the Institution.
*——— of Philosophical Society of New South Wales, 1862-5. From the Society.
*——— of Society of Naturalists, Hamburg. From the Society.
Vertebrata, Structure and Development of Shoulder Girdle and Sternum in. By W. K. Parker, Esq., F.R.S. (*Ray Society's Volume for* 1867.)

## LIST OF OBJECTS PRESENTED TO THE MUSEUM DURING 1869, WITH NAMES OF DONORS.

Allport, M., Esq., F.L.S., F.Z.S.—Gelatinous tube of Salpa, and small Crustacean found within it. From Adventure Bay. Two fish, name unknown, caught at Wedge Bay.
Aubin, F., Esq.—A Sun-Fish (*Orthagoriscus sp.*), from Spring Bay.
Bennett, Dr.—A Crab from Sandy Bay.
Bilton, H., Esq.—A double head of Calf. Curious growth of root of tree.
Barnard, J., Esq.—A Package of Seed of Sugar Beet for distribution. Specimens of Cinnabar ore from the Cudgegong, New South Wales.
Bomford, F. E., Esq.—Specimens of Fluke (*Distoma sp.*) from Liver of a Shark.
Buckland, Mrs. J. R.—A Bullet from a double-barrelled gun, found loaded, on the 30th May, 1859, by the side of two skeletons belonging to the retreating party of Sir John Franklin's expedition, in a boat on the west coast of King William's Island, lat. 69deg. 8min., N., long. 99deg. 24min., W. [Vide "Fate of Franklin and His Discoveries," by Captain McClintock, page 294.] A portion of a Boat's Ensign, belonging to the same expedition, left at the Northern Cairn, Cape Felix, May, 1847, and discovered May, 1859, by Lieut. Hobson, of Lady Franklin's screw yacht Fox. A portion of the Riband of the Order of the Redeemer, of Greece, worn by the late Sir John Franklin. An Almond from the Convent Garden on Mount Sinai.
Cox, Dr. J., Sydney.—Sixty-seven specimens of Shells. A large number of Shells from various parts of the world.
Castray, L. R., Esq., A.C.G.—A letter in the New Zealand language, addressed by one native to another, with translation. Six specimens of Woods from Madagascar.

**Castray, Miss.**—Leaves of Silver Leaf Tree, from Table Mountain, Cape of Good Hope; a Damara Lady's Necklace, from South Africa.

**Clifford, Mr. G. P., Dunedin.**—Two Limestone Boulders *(Septaria)* from Moeraki Beach, New Zealand

**Dyer, Mr. R. T.**—An albino variety of the Rosella Parrot (*Platycercus eximius.)*

**Dear, Rev. R. E.**—Specimens of Iron Ore and laminated Quartz. A number of stone implements of the Aborigines collected by Mr. Rollings, of Forcett.

**Dinham, Mr. G.**—Two Fossil Shark's Teeth from the Lias, near Bath, England.

**Edwards, Miss S. P.**—Specimens of Salpa found at sea on the passage from England. Eleven Copper Coins and Tokens.

**Exton, Mr. W., Oatlands.**—An Owl *(Strix castanops.)*

**Edgar, Mr. J. C., Sorell.**—Seven specimens Land Shells.

**Ferguson, P., Esq.**—A Letter of the Chetty Merchants *(Tamils)*, of Southern India and Ceylon, with an explanatory note.

**Gooch, Mr. G. F.**—A small Silver Coin.

**Gellibrand, W. A. B., Esq.** —A female specimen of the native Tiger (*Thylacinus cynocephalus)*. Photographs of Machinery in Leeds Exhibition.

**Gates, Mr., Jerusalem.**—A Black Cockatoo.

**Glover, Mr.**—Fifteen Geological Specimens from West Coast of Tasmania.

**Guichard, M. H., ship La Somme.**—One Bronze Coin, five cents; one Silver ditto, five cents, Napoleon III., 1862.

**Garth, Captain.**—An Albatross (*Diomedia exulans.)*

**Hannaford, S., Esq.**—Specimen of Sipunculas from Corio Bay, Geelong. An Ostracion. Two Seeds of Trappa Bicornis from China.

**Heron, M. C., French ship La Somme.**—Two copper coins, colony of Cayenne, Louis XVI., 1789. One ditto Republic of Berne, 1796.

**Hull, H. M., Esq.**—A Key-hole Limpet; a Chiton; a Magpie Perch; a Malay Kris; three small Fish.

**Hedberg, Mr. Oscar.**—A collection of Shells from East Coast of Tasmania.

**Holmes, Mr. F.**—Portion of Skin of Whale tanned.

**Harrop, E. D., Esq., Launceston.**—Four mounted specimens of Sheep Fluke *(Fasciola hepatica.)*

**Hull, J., Esq.**—A Falcon *(Falco melanogenys)*.

**Johnston, W., Esq., Trinity Hill.**—A Boomerang and Waddie from Queensland; a Spear from New Hebrides; a large Seed, said to have been taken from the stomach of a Barracouta; four Coins, and one Brass token.

**Jones, Mr. J.**—A small Turtle from Lady Elliott's Island.

**Kelly, Mr. J.**—A Shilling of Queen Anne, 1707, and a Danish Coin, 1771. A Brass Basin (Indian).

**Knight, Mr. W., jun.**—A collection of Geological Specimens brought by Mr. Glover from the western coast of the Island.

**Krefft, G., Esq., Sydney Museum, per M. Allport, Esq.**—Five Bird Skins from King George's Sound.

**Legrand, Mr.**—Specimens of new species of Helix *(Helix Allporti.* Cox.) Two ditto of *Bulimus Tasmanicus.*

**Luttrell, Mr. G.**—Shell impressions from Port Cygnet.

**Milligan, Dr., London.**—Seven packages dried Tasmanian Plants, named by Dr. Hooker. Two ditto of Italian plants. Six specimens of *Calymene Blumenbachii* from Wenlock Shale, Gotland. Specimen of Esparto Grass, for paper making.

**McLaren, Mr.**—A cluster of Barnacles from piles of wharf.

**Manley, Miss S. A.**—Four specimens of *Chamostrea* from Carlton beach.

**Maclaine, J., Esq., Clarke's Island.**—An Avocet *(Recurvirostris rubricollis.)*

**Meredith, Hon. C., Esq.**—Two specimens of Silver Fish from Prosser's Bay.

**Meredith, Mrs. C.**—Specimen of Australian Coot *(Fulica Australis,)*

**McRa, Mr. H.**—Three Geological Specimens from Bothwell. A stone implement of the Aborigines.

**Mitchell, Mr., Sandy Bay.**—A Basket and Necklace made by Aborigines of Tasmania.

Maclanachan, J., Esq.—A Hen Golden Pheasant. A Pheasant (a cross between English and Chinese varieties.) One ditto.
Maning, A. H., Esq.—A Sun Dial made and used by Spanish shepherds.
Nichols, Captain T.—Skeleton of a Fish from Howe's Island.
New, Mrs.—A Brown Trout *(Salmo fario)* caught in the Bagdad Creek.
Officer, Sir R.—A White Hawk.
Propsting, R., Mr.—A Swamp Hawk *(Circus assimilis.)*
Peck, Miss.—An English Barn Owl *(Strix flammea)*, prepared and mounted.
Rollings, Mr., Sorell.—A Jade Chisel from New Zealand. A stone implement used by Tasmanian Aborigines for skinning Kangaroo, &c.
Ransome, Mr. R., Southport.—Specimen of Felspar Porphyry, and the ear-bone of a Whale.
Ransley, Mrs.—A Lizard with double tail.
Rossitor, Mr.—Specimen of the Maori Hen of New Zealand. An English Partridge. Three bones of foot of Moa *(Dinornis sp.)*
Roblin, Mr.—A Black Cockatoo *(Calyptorhynchus xanthonotus.)*
Room, Mrs., Launceston.—A half Rupee.
Roberts, Captain.—A Snake and three large Centipedes.
Swan, J., Esq.—Skeletons of Forester and Brush Kangaroo.
Swan, E. D., Esq.—Polished specimen of Fluor Spar from Derbyshire, England.
Salmon Commissioners.—A Salmon Smolt caught in the Derwent.
Stagg, Mrs.—Eight Limestone Fossils *(Tasmanian.)*
Stephens, T., Esq.—A Kingfisher *(Alcyone sanctus)* from Southport.
Swift, Mr. A. H., Little Taylor's Bay.—Two specimens of Hæmatite from Point Ventinat.
Swan, E. D., Esq.—Nest and egg of *Epthianura albifrons* from Cornelian Bay.
Story, Dr., Swansea.—Skeletons of Wedge-tailed Eagle, Crane, Bandicoot, &c.
Seymour Coal Company.—Slab of Shale with plant impressions, from Seymour Mines. Specimen of Coal from West Wanganui Inlet, New Zealand.
Taylor, Mr. A. J., New Norfolk.—A Copper Coin of French Republic.
Townsend, Mr. J.—Specimens of calcareous incrustations on roots of plants, from sandy beach at Pittwater.
Thomas, Mr. W. J.—A large specimen of Native Bread *(Mylitta Australis.)*
Turner, Mr. H.—An Irish Penny, and a Sydney token.
Wintle, Mr. S. H.—A vegetable impression in Shale from Mount Wellington *(Endogenophylites Wellinglonensis.* McCoy.) A cluster of plant impressions from Claystone. Fragments of Shale with impressions of plants, from New Town. Specimen of *Pholas* from Sandy Bay. A Gall Fly and nest; also a smaller species with its larva. Seventeen named specimens of Tasmanian Coleoptera. Specimen of Cleithelepis from New South Wales, discovered by the Rev. W. B. Clarke. A mineral specimen from the Mudstone, Huon Road.
Whitely, Mr.—A Silver Coin, 10 cents, Netherlands, 1849.
Walch, Mr. J. H. B.—A Shilling of Queen Elizabeth; a Farthing of George II., 1741; a Copper Coin of French Republic (L'an 5); ditto of one of the Roman Emperors.
Whitcomb, G., Esq.—Samples of Coal from Lambton Colliery, Newcastle, and Bituminous Shale from Hartley, New South Wales. A sample of Sugar Cane grown in Queensland.
Wilkinson, F. B., Esq.—A Mountain Duck *(Casarca tadornoides)*.
Williams, Captain.—Sample of Mineral Water, from Spring Bay. Tail of Tunny.
Young, Mr. J.—Eight specimens of Crustaceans.

## PLANTS AND SEEDS RECEIVED AT THE ROYAL SOCIETY'S GARDENS DURING 1869.

February 10th.—From the Acclimatisation Society, Christchurch, New Zealand.—Two packets Seeds.
February 20th.—From Mr. C. F. Creswell.—Nine packets Seeds, eleven species tuberous plants received from England.
March 2nd.—From Mr. C. F. Creswell.—Eighteen first-class new Dahlias.
April 5th.—From Mr. T. C. Wren, Mount Hobson Nursery, Remuera, New Zealand.—One Case containing 24 plants.
April 5th.—From the Melbourne Botanic Gardens.—One Case containing 14 plants.
June 15th.—From Mons. Verschaffelt, Ghent, Belgium.—One Case containing 48 plants, of which 33 were alive and 15 dead; one Bundle containing 106 varieties fruit, of which 43 were alive and 63 dead.
June 25th.—From Mr. G. Brunning, St. Kilda Nurseries, Melbourne.—One Case containing 60 plants.
June 25th.—From Mr. Joseph Harris, South Yarra Nurseries, Melbourne.—One Case containing 47 plants.
June 25th.—From the Melbourne Botanic Gardens.—One Case containing 29 plants.
July 14th.—From Mr. E. B. Heyne, Seedsman, Adelaide.—28 packets seeds.
July 16th.—From Mr. S. Clifford, Dunedin, New Zealand.—Five plants Cyathea.
July 21st.—From the Ven. Archdeacon Davies.—Twenty-two varieties Pelargonium seed.
July 27th.—From Mr. James Jones, Melbourne.—Two packets seeds.
August 20th.—From the Melbourne Botanic Gardens.—One Case containing 18 plants.
September 4th.—From Messrs. Taylor and Sangster, Toorak Nurseries, Melbourne.—One Case containing 16 plants.
November 10th.—From Mr. Robert Young, Gipps Land.—One packet Pittosporum seed.
November 23rd.—From Mr. C. F. Creswell.—Six packets seeds.
December 21st.—From Joseph Milligan, Esq., London, favoured by Captain Lulham.—48 packets seeds.
December 24th.—From Messrs. Taylor and Sangster.—One Case containing 59 plants.

## PLANTS AND SEEDS SENT FROM THE ROYAL SOCIETY'S GARDENS DURING 1869.

February 27th.—To Mons. A. Verschaffelt, Ghent, Belgium.—One packet Seeds.
March 24th.—To the Melbourne Botanic Gardens.—Lot Box Cuttings.
March 30th.—To the Sydney Botanic Gardens.—One Case containing 40 plants.
May 8th.—To J. W. Newman, Esq., Adelaide.—One Box containing 25 plants.
May 25th.—To Mr. Joseph Harris, Nurseryman, Melbourne.—One Case containing 44 plants and 26 papers seeds.
May 26th.—To Messrs. Taylor and Sangster, Toorak Nurseries, Melbourne.—Thirty-six varieties Bulbs.
June 16th.—To Mr. G. Brunning, St. Kilda Nurseries, Melbourne.—One Case containing 54 plants and 12 packets seeds.
September 9th.—To Messrs. Taylor and Sangster, Toorak Nurseries.—Nine packets Conifer Seeds.
September 28th.—To Mr. S. Clifford, New Zealand.—One Case containing 25 plants.
December 20th.—To the Sydney Botanic Gardens.—One Case containing 40 plants.

## PLANTS SUPPLIED FOR THE DECORATION OF PUBLIC PLACES DURING 1869.

For Government House Grounds.—Ninety plants.
For decoration of the grounds of Cascade Invalid Depôt.—Forty Cypress plants, eighty Trees and Shrubs, and thirty six Herbaceous Plants.
For the grounds of Church of England, Campbell Town.—Thirty-six plants.
For Castray Esplanade.—Seventy plants.

F. ABBOTT, Jun.,

*Superintendent R. S. Gardens.*

## PLANTS INTRODUCED INTO THE ROYAL SOCIETY'S GARDENS DURING 1869.

Alseuosmia quercifolia
Anemone apennina
,, fulgens
,, Narcissifolia
Aralia Sieboldtii
Aristolochia gigantea
Asclepias Douglassii
Bellevalia ramosa
Bobartia aurantiaca
Bomaria multiflora
Buxus latifolius
Caloscordium nerinifolium
Campanula Elatineæ
,, Hoheneckeri
Carya oliviformis
,, tomentosa
Cestrum Palqui
Chelone barbata Torreyi
Chorizema diversifolia
,, soulangeana
,, spectabilis
Citriobatus microphyllus
Claytonia perfoliata
Corokia buddleoides
Cotoneaster laxiflora
Cosmus bipinnatifidus
Crocus chrysanthus
,, nivalis
Cummingia bulbocodium
Cuphea purpurea Kermessina
Cussonia thyrsiflora
Dactylis cæspitosa
Datura fastuosa Huberiana
Dahlia imperialis
Delphinium Madame Rougiere
,, Queen of England
Dianella Media
Draba Bætica
Ehretia acuminata
Enothera Drummondi nana
Epimedium alpinum
,, grandiflorum
,, pinnatum
Erica baccans
,, calycina major
,, Margaritacea
,, persoluta
,, Plukenetii
,, tetralix
Erica tubiflora
,, vulgaris
,, Willmoreana
Esculus rubro atrosanguinea
Fraxinus pendula aurea
Galanthus plicatus
Galaxia Germanica
Gentiana lutea
Gesnera Princei
Gossipium Sturtii
Habranthus Andersonii
Hepatica angulosa
Hoheria populnea
Hydrangea japonica
Ipomæa filicifolia
Iris reticulata
Ismene sp.
Jacaranda digitaliflora
,, digitaliflora alba
Jasione humilis
Jubæa spectabilis
Lilium Takesume
,, testaceum
Linaria alpina
,, tripartita superba
Lobelia Cardinalis Q. Victoria
,, fulgens purpurea
Melicytus lanceolatus
Merendera bulbocodium
Mesembryanthemum Tegens
Narcissus juncæfolius
Ornus rotundifolius
Oxalis tropæoleoides
,, valdaviana
Passiflora Jumbo
Pentstemon glabra
,, Lobbi
Phenocoma prolifera
Pithocolobium umbrosum
Pinus patula
Pimelia diosmæfolia
Plagianthus Lyalli
Podocarpus dacrydioides
Polygonatum verticulatum
Prunus sinensis rosea
Psidium album
Retinospora ericoides
,, plumosa
Rhabdothamnus Solandri

Rhamnus utilis
Sagus ruffia
Saxifraga Fortunii
Scilla umbellata
Scizostylis coccinea
Sericographis Ghiesbrightiana
Silene alpestris
Solanum acanthocarpum
Spiræa umbrosa
Swainsonia Greyana carminea
Syringa Charles X.
Taxodium Sinensis
Terminalia Bellerieri
Thea Assamica
,, viridis
Thujaopsis lætevirens
Tydea venosa
Ulmus campestris aurea variegata
Ulmus Montana Vegeta
,, Sinensis aureus variegatus

## FERNS.

Adiantum Cunninghamii
,, Capis veneris
,, formosum
,, nigrum
,, pubescens
Aneimia fraxinifolia
Aspidium molle
,, Sieboldtii
Asplenium Adiantum nigrum
,, attenuatum
,, ebenum
,, falcata
,, flabellifolium
,, flaccidum
,, laxum
,, trachominoides
Blechnum Braziliensis
,, gracile
Cyathea medullaris
,, dealbata
Davallia canariensis
,, Giberosa
Diplazium Twaitsii
Doodia aspera
,, caudata
,, caudata confluens
Gleichenia microphylla
Gymnogramma sulphurea
Leptopteris hymenophylloides
,, superba
Lomaria Pattersonii
,, pumila
Lycopodium cæsium violaceum
,, umbrosum
Lygodium articulatum
Maraltia salicina
Niphobolus lingua
,, rupestris
Pellæa rotundifolia
Platyloma falcata
Polypodium angustifolium
,, glaucum
,, paradasiaca
,, vaceolens
Pteris cretica
,, cretica alba lineata
,, japonica
,, longifolia
,, pinnata
,, rotundifolia
,, scaberula
,, semipinnata
Scolopendrium officinarum
Trichomanes elongatum
,, reniforme
Zinniscium serratum

## TREE PÆONIES.

Pænia Moutan Avocat Guillon
,, Cardinel Antonelli
,, Dyonidii
,, George Rollison
,, Germanica
,, lactea
,, Mde. Guidebach de Raes
,, odorata plenissima
,, papaveracea fimbriata
,, papaveracea albo pleno
,, Professor Morren
,, Victoria Superba

## ROSES.

Achille Gonad
Alfred Colomb
Alpaide de Rolatier
Beauty of Waltham
Countesse de Barbautaume
Evêque des Nismes
François Lacharme
Heroine Vaucluse
John Keynes

La Duchesse de Morny
Louis XIV.
Madame Roussett
Marguerite Bonnet
Model of Perfection
Prince Leon
Princess Mary of Cambridge
Princess of Wales
Rushton Radcliff
Souvenir de W. Wood
Senateure Favre

### PELARGONIUM.

Belle of the Ball
Fantastic
Fair Rosamond
High Admiral
John Hoyle
Magnet
Rosa Bonheur
Royalty
Regularity
The Prince

### GERANIUM.

Arab
Autocrat
Beauty of Europe
Clio
Crystal Palace Gem
Crimson Queen
Cybister
Dr. Hogg
Enchantress
Ephraim
Excellent
Gaiety
Gloire de Nancy
Golden Pheasant
Jason
Luna
Legrand
Mangle's silver variegated
Model
Monte Rosa
Prince Imperial
Purple Queen
Rival Stella
Sambo
St. George
Triumphans
Triumph de Lorraine
Waltham Nosegay

### FUCHSIA.

Arabella
Bland's florabunda
Conquest
Diadem
Favourite oi Fortune
Lady Heytesbury
Mrs. Gladstone
Rose of Denmark

### VERBENA.

Beauty
Daylight
Empress
Ensign
Eugenie
Gipsy Queen
Lion Hunter
Mary Ann
Miss Mary Law
President
Queen Victoria
Ringleader

### DAHLIA.

Andrew Dodds
Angelina
Bessie
Chairman
Constance
Caroline Tettrell
Chameleon
Compacta
Delicata
Flower of the Day
Golden Pheasant
Grand Sultan
Hebe
Lady Derby
Leopardess
Lord Derby
Lord Fielding
Memorandum
Miss Manners-Sutton
Miss Turner
Mrs. Crisp
Mrs. Dodds

Mrs. Piggott
Mont Blanc
Nora Creina
Princess Radcliff
Prince of Russia
Purple Gem
Queen Mab
Queen of Whites
Rosy Queen
Summertide
Sparkler
Sir Greville Smythe
Tiffany
Viceroy
White Standard
Wonderful

### APPLES.

Annat Scarlet
Beauty of Wilts
Blenheim Pippin
Bull's Golden Reinette
Coccagee
Ingestrie Yellow
Lodgemore Nonpareil
Magnum Bonum
Nelson's Codlin
Nonsuch Paradise
Pine Apple Russet
Prizetaker
Rick's Nonsuch
Rosemary Russet
Striped Beaufin.

### PEARS.

Bell de Bruxelles
Kingsessing
Trillington

### PLUMS.

Early Prolific
Guthrie's Late Green
Siegel's Apricot

### STRAWBERRY.

Cockscomb

F. ABBOTT, JUNR.,

*Superintendent R. S. Gardens.*

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